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ABSTRACT

The proceedings of a seminar on the financing of education in Latin America are recorded here. In the Seminar's 11 sessions, technical officials from Latin American countries discussed and analyzed two broad areas of mutual interest. The first area was the relationship between expanding educational programs, their cost and financing, and socioeconomic development in the context of each country's historical experience. The second area was the adoption of new policies and priorities in the educational sector, in particular the need to shift the emphasis from high unit cost secondary and postsecondary levels to low unit cost primary levels, and the attendant social and economic benefits accruing to lower income groups. In this context, forms of vocational training and technical education that might enable new types of non-budgetary fiscal resources to be brought to bear on the problem were considered. The need to give special emphasis to the rural and urban marginal sectors of the population, to assign priority to primary education, and to extend the coverage and improve the quality of that education was also examined, as was the need to increase public outlays if dropout and repetition rates were to be reduced. (Author/RDN)

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Inter-American Development Bank

THE FINANCING OF EDUCATION IN LATIN AMERICA

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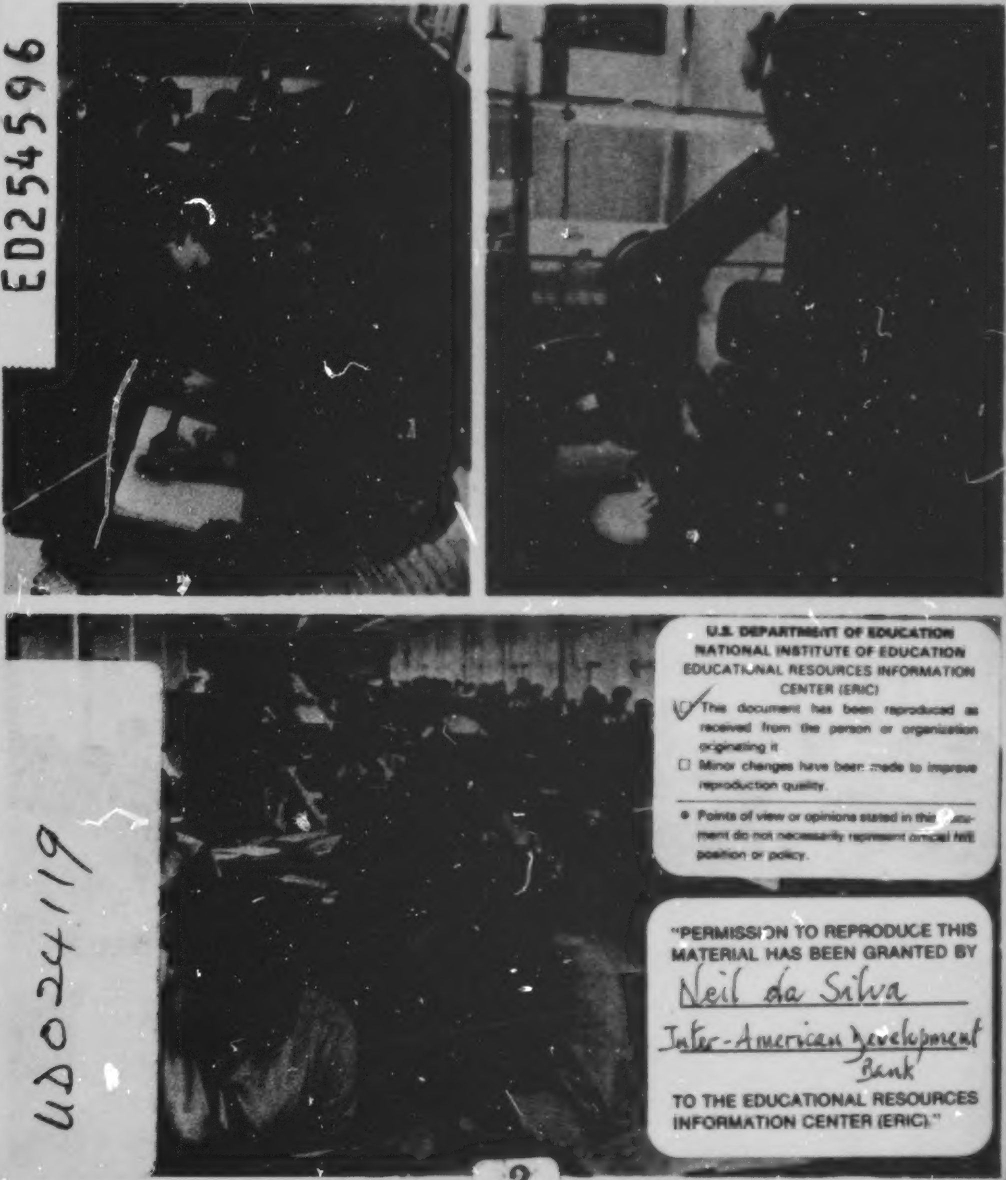

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SEMINAR ON THE FINANCING OF EDUCATION IN LATIN AMERICA

Sponsored by the Inter-American Development Bank and the Government of Mexico

Mexico City, Mexico

November 27-December 1, 1978

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Preface

As part of its continuing effort to further the development of education in Latin America and the Caribbean Area, the Inter-American Development Bank (IDB) has sponsored two seminars on the financing of education.

The first seminar was held in Washington, D.C., from November 15 to 19, 1976, and its proceedings were published in 1978.[1] The second seminar was held under the joint sponsorship of the Government of Mexico and the Inter-American Development Bank in Mexico City from November 27 to December 1, 1978.

The Second Seminar, which continued the dialogue initiated at the First Seminar, reflected both the broadened base of those participating and an increased concern with fiscal and educational policies for dealing with the new needs arising from changing economic and social conditions.

Technical officials from the countries of the region met to discuss and analyze two broad areas of mutual interest. The first area was the relationship between expanding educational programs, their cost and financing, and socio-economic development in the context of each country's historical experience.

The second area was the adoption of new policies and priorities in the educational sector, in particular the need to shift the emphasis from high unit cost secondary and post-secondary levels to low unit cost primary levels, and the attendant social and economic benefits accruing to lower income groups. In this context, forms of vocational training and technical education that might enable new types of non-budgetary fiscal resources to be brought to bear on the problem were considered. The need to give special emphasis to the rural and urban marginal sectors of the population, to assign priority to primary education, and to extend the coverage and improve the quality of that education was also examined, as was the need to increase public outlays if drop-out and repetition rates were to be reduced.

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[1] Cf., *Financiamiento de la Educación en América Latina*, Mario Brodersohn and María Ester Sanjurjo, editors. México City: Fondo de Cultura Económica, Banco Interamericano de Desarrollo, 1978.

In publishing this volume containing the papers presented at the Second Seminar, the Bank hopes to contribute to an increased understanding of these important problems. This publication will, we believe, be of special interest not only to officials in the region who are responsible for formulating and implementing policies affecting education and its financing, but also to a wider audience that includes scholars in the various specialities that bear on those problem areas. The Bank is grateful not only to those participants whose studies and expertise are included in this publication, but also to the many participants who contributed to the lively discussions. It is a matter of regret that space limitations have prevented us from including the invited comments and details of these stimulating exchanges of views.

A summary of the Second Seminar was prepared by Maritza Izaguirre P., Sociologist, formerly Deputy Manager for Technical Cooperation, IDB, Washington, D.C., in cooperation with Rubén Omar Cecilli, Sectoral Specialist in Education, IDB Field Office in Costa Rica. The Department of Economic and Social Development of the IDB was responsible for the overall organization of the Second Seminar.

Antonio Ortiz Mena,
President

SUMMARY OF THE SECOND SEMINAR ON THE FINANCING OF EDUCATION[1]

A. Objectives of the Seminar

On June 7, 1977, the Government of Mexico expressed interest in holding a seminar on the financing of education in Latin America. It was to be the second phase of the first meeting on this subject, held in Washington in November 1976. The principal purpose of the seminar was to bring together technical officials from regional countries to analyze the relationships between expanding education programs, their cost and financing, and economic and social development in the context of the experience of the countries.

B. Organization and Structure

The Bank, and the Government of Mexico through its Ministry of Public Education, established an organizing committee, which selected the topics for discussion and the experts who were to prepare the nine basic discussion papers. In addition, specialists in the relevant fields were asked to contribute written comments on the nine main topics. The Bank, through its Field Offices, invited each member country to appoint two delegates who were to describe its experiences in the areas concerned.

The Seminar was held in Mexico City from November 27 through December 1, 1978.

C. Work of the Seminar

The first three working days of the seminar were devoted to a general discussion of education, development, and financing problems, and the remaining two, to an examination of the financing of specific educational levels.

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[1] Based on the Report of the Rapporteur of the Seminar prepared by Maritza Izaguirre P., Sociologist, Deputy Manager for Technical Cooperation, Inter-American Development Bank, Washington, D.C., U.S.A., in cooperation with Ruben Omar Cecilli, Sectoral Specialist in Education. IDB Field Office in Costa Rica, San Jose, Costa Rica.

1. *Education and economic and social development in the region*

The basic thesis was the existence of a close relationship between the nature of the region's economic development in the sixties and its educational systems. In the period 1960–1975 there was a sharp upturn in public spending and a rapid increase in student enrollment in secondary and higher education, coupled with a decline in the primary school enrollment ratio. This situation was a reflection of the style of development adopted by the Latin American countries, which emphasized a certain type of industrialization as the basis of economic growth, while neglecting employment generation and income distribution. Consequently, no priority was assigned to elementary and rural education.

In the 1980's, new objectives that call for an educational system better geared to the new Latin American development strategy, from the standpoint of both resource allocation and equitable income distribution and satisfaction of the basic needs of the population, need to be formulated.

In this respect, the discussion centered on two points:

First, whether or not to continue to devote the present share of public budgets or GNP to education would mean continuing the policies of the past in the field of education.

Second, the financial consequences of the following three new educational objectives and reforms:

a. A shift in emphasis from levels with high unit costs (secondary and university), which favor the middle and upper income groups, to those with relatively lower costs (primary), which benefit the lower income groups.

b. The development of innovative types of vocational and technical education that would make it possible to use new sources of nonbudgetary resources and also to give more attention to rural and urban marginal sectors;

c. The assignment of priority to primary education in order both to extend its coverage and to improve its quality, which would entail larger public outlays if school drop-out and repetition rates were reduced and unit costs per student increased.

2. *Analysis and projection of educational outlays in the region*

The historical data show that, in the period 1960–1975, public spending on education increased and, in some instances, amounted to more than 25% of the national budgets and more than 4% of GNP. However, later research findings presented at the Washington Seminar, indicated that beginning in 1980 this trend will level off as a result of the declining birth rate, among other factors.

Consequently, it was deemed necessary to construct an econometric model that would estimate the demand for education resulting from the living conditions of the population (represented by proxy variables such as birth rates and energy consumption), the participation of the male population in the economically active population, and the degree of urbanization. Accordingly, the econometric results of a cross-section analysis of 1970 data were used to project the educational demand by levels based on estimates of those exogenous variables for 1980, 1985 and 1990.

Assuming constant unit costs, these projections show that, as of 1980, public outlays on education in Latin America as a percentage of the GNP's and national budgets will tend to decline. However, this presupposes that educational priorities and unit costs will not be changed, and that the demand for education as a "positional good" will remain at 1970 levels. The fact that educational demand will remain static implies that employment opportunities would expand at the same rate as the labor force.

This proposition elicited the following observations:

a. The specifications of the model could be deficient, and the information used for its estimates inappropriate, with the result that the projections could be under-estimates;

b. Data for certain countries (specifically Costa Rica and Venezuela) show a far greater increase in enrollments and public outlays on education in the period considered than that indicated by the projections for 1980;

c. A number of countries mentioned that qualitative changes were being introduced and entailed higher unit costs;

d. The danger of underestimating the projections and the socio-political consequences of such underestimation.

Nevertheless, if the changes in levels of schooling and public expenditure on education projected by the model were accepted, it would be possible, without greater financial pressure, to increase public spending on primary education for lower-income and rural groups and this would help improve income distribution.

3. *Education outlays and the public sector*

The fact that the present ratio of tax revenue to gross national product in Latin America is low and remained unchanged between 1960 and 1973 was largely due to the fact that the growth of the Latin American public sector in recent years has been increasingly financed with extra-budgetary funds from autonomous agencies, public enterprises, and similar sources. Hence, the real public sector participation in Latin American economies is much greater—approximately 33% of GNP.

In the case of social outlays (housing, social security, public health), it must be remembered that financing is also basically provided by extra-budgetary sources and for specific purposes. As a result, the possibility of trade-offs between expenditures on education and other social outlays is rather limited.

In the light of these considerations, a mathematical model based on the following assumptions was developed:

a. That State participation in economic activity will remain constant;

b. That investments as a percentage of aggregate public spending will not decrease; and

c. That investment in education entails high recurrent costs.

The model shows that the major factor in the upward trend of public outlays on education in Latin America is the GNP growth rate. It also indicates that the above-mentioned limitations cannot be overcome by using public debt.

Furthermore, in view of the need for additional receipts for financing educational outlays, taxation is one of the few methods available for obtaining additional funds. Higher taxes would have a positive effect on income distribution and equality of opportunity.

The following comments were made on this mathematical model:

a. The statistical information used as a basis for certain initial conclusions was outdated, and different conclusions might be reached if more recent data were used;

b. Some assumptions of the model regarding parameters or basic relationships were not sufficiently realistic. The model did not consider the possibility of increasing educational outlays by reducing others, such as defense spending, or by making more efficient use of the resources available. An excessive degree of State intervention is not present in all the countries. Moreover, increased State participation would be welcome under certain circumstances for more intensive exploitation of natural resources. The assumed percentage of current outlays represented by spending on education was found to be relatively high. Reservations were expressed regarding the assumption that investments in economic infrastructure always have a more direct and immediate effect on the growth rate of GNP than educational investments.

4. *Public and private financing of education*

To complete the analysis of the financing of educational outlays, both public and private financing must be considered.

An examination of the results of the aforementioned projections with a view to estimating the financial effort that should be made by the countries of Latin America, the technical and conceptual limitations of which have been discussed, leads to the conclusion that such effort—measured in terms of the percentage share of educational outlays (public and private) in GNP and public budgets—will continue to grow until 1980 and then decline. The political importance of this conclusion is self-evident. If the growth trends of financial requirements in the seventies are gradually reversed in the eighties, governments will not only have to find new sources for financing larger educational outlays, but will also have to make the level and structure of both spending and financing more consistent with the requirements of increased efficiency and distributive equity.

When future financing alternatives are stated in those terms, it is found that both the level and the mix of public and private financing of educational expenditures depend far more on the societal scale of values and traditional degree of State intervention than on economic considerations.

The major sources of private and public financing of education were examined in the light of that consideration in order to determine the extent to which they satisfy the criteria of equity and efficiency.

There is some doubt about the possibility of increasing the contribution of private financing sources to education, especially that of low income groups, which is not as small as is supposed, since it includes the income forgone by the family while the student is studying, certain educational expenditures such as the cost of books, transportation, uniforms and extra courses and, in some cases, fees, and the contribution of rural communities to the financing of their schools. Moreover, a large number of private schools for lower income groups are now in the throes of financial crisis because fees do not cover operating expenses.

In analyzing the sources of public financing, educational loans for higher education and taxes earmarked for vocational and technical education should be taken into account. Unless the State increases its contributions for educational loans, or can establish a satisfactory collection system, educational loans cannot become a significant source of financing educational needs. Except in Colombia and Brazil, coverage of the technical and vocational education system is very limited, and use of a payroll tax to expand the system could discourage labor-intensive production processes.

In view of the rapid increase in the student population and free education at the higher level, three alternative proposals for its future financing were discussed; the first, that at this level public subsidies be granted in inverse relation to family income; the second, that a special tax be levied on professionals that benefited from subsidies in the past; and the third, that the total cost of education should be charged but that loans (credit) and scholarships should be made available so as to ensure that access to university education is equitable and independent of the income level of the student.

Although the level and method of financing expenditures on education depend on socio-political considerations, it is equally true that a country's educational effort affects its socio-political structures. This dual interaction between socio-political factors and schooling should be examined in greater depth in future studies. A second comment addressed the difficulty of analyzing the financing structure of education in the region as a whole because of the differences in political and social conditions in the countries. A third was that, in the relatively less developed countries, primary education should be considered a public good, access to which should be guaranteed to all social groups by the State. Finally, it was pointed out that, given the levels of unemployment and underemployment obtaining in many countries of Latin America, income forgone should be evaluated exclusively in terms of its possible impact on the income of the family unit, and not in terms of its cost to society. In addition, since many university students work during the day and study at night, it is more correct to speak of "leisure forgone" than of "income forgone" and, because of the defects of educational credit arrangements and tax systems, the best way of financing higher education, while respecting standards of equity and efficiency, would be a mixed system of charging fees and granting subsidies (scholarships) according to the income level of the students' families.

5. *Educational expenditures and democratization of education*

The foregoing paragraphs have examined the relations between the development process and the educational system, projections of public expenditure on education, and analysis of the various sources of financing. The next question is: Given the present situation in Latin America, to what extent it is possible to achieve such objectives as the democratization of education with the resources available?

Accordingly, a statistical exercise was conducted to ascertain what would be the financial impact on Latin America if the higher-income social sectors—which at present receive a substantial subsidy in the form of free public education—were to pay the total cost of their education and the public funds released in this way were used exclusively to subsidize the education of lower-income families.

The use of indicators showing the breadth and efficiency of educational systems, such as enrollment ratios and drop-out, repeater, and overage rates, makes it possible to divide Latin American countries into four groups, each with rather similar social structures. This classification shows that, in the developing countries, the educational system is less advanced and more regressive; that both the coverage and the efficiency of the system improve as higher levels of economic development are attained; and that the higher the level of development of the countries, the lower the regressivity of the system.

Having defined the educational structure of the countries in the foregoing terms, the exercise goes on to estimate the amount of public sector resources that would be released if higher-income students were to pay the entire cost of their secondary and higher education, whether in the public or in the private sector. The fiscal resources released by the adoption of such a measure would equal 14% of the present overall public expenditure on education.

Once the extent of the resources that would be made available in this way has been determined, the following question arises: what additional resources would be needed if the objective were to improve primary school coverage of lower-income groups by requiring a minimum of four full years of schooling? The analysis seeks to quantify the impact, first, of an improvement in the retention rate of students already enrolled in primary schools and, second, of the incorporation into the system of all the children who are still out of primary school.

The results show that the financing required to achieve these goals would represent 39% of public expenditure on education, which exceeds by far the 14% that would be made available if higher-income students were to pay for their education. In addition, they show that these measures tend to stratify higher education into high-cost universities for higher income groups and low-cost universities for lower-income groups.

Accordingly, the exercise shows that the achievement of the objective of democratizing education has a number of financial and policy implications and that there is more than one answer to the problem of financing the education of the groups that are still not incorporated into the system.

It was criticized from the standpoint of the validity of the statistical sources used and for the fact that it rules out an increase in the internal efficiency of the educational system as another source of financing. In addition, by considering education solely a consumption good and not an investment in human capital, it ignored the fact that there would be not only costs but also benefits for society in terms of economic efficiency.

6. *Financing of basic education*

It was considered advisable to study the various mechanisms adopted by the system to finance basic education, especially measures designed to increase its internal efficiency.

Basic education indicators for the early 1970's showed that drop-outs and repeaters were still a serious problem. Furthermore, some research has concluded that the unfavorable socio-economic conditions of students and their scholastic achievement play a decisive role in repetition and drop-out problems.

A number of measures designed to reduce repetition, including pre-school education, modified promotion requirements, training programs for parents, early stimulation through television programs, curriculum changes, availability of text books and teaching materials, and adding grades to make up complete schools, were discussed.

Chile and Paraguay were selected as case studies for ascertaining the cost of programs designed to increase scholastic achievement, reduce repetition and attrition, and expand school coverage.

In Chile, drop-out and repeater rates were reduced substantially between 1970 and 1977 as a result of such activities as school lunches, breakfasts, and the provision of textbooks, teaching materials, and shoes for students. Curricula and promotion mechanisms were modified and parent participation was encouraged. Other measures, such as expanded educational television programs, training of parents, transportation for students, adding grades to make up complete schools, and distribution of texts and notebooks, accounted for a total expenditure of US$14.5 million, or 2.7% of public outlays on education. In Chile, these measures could be supplemented by others involving no additional cost—such as curriculum changes, less frequent rotation of teachers, rescheduling of the school calendar, and organizational changes—to strengthen the initial measures described above.

All the foregoing measures could be financed with the funds that would be obtained by increasing the average number of students per teacher from 36 to 40, i.e., by 11%, which would release resources amounting to US$19.2 million.

Paraguay's situation is different. The number of students per teacher there is very low (29), and the situation of rural schools differs from that of Chile. Accordingly, raising the number of students to 40 would take care of some 50% of the students not currently enrolled in primary education. To reduce the number of school drop-outs would require the adoption of a strategy similar to that of Chile i.e., educational television, textbook distribution, and completion of schools. All these measures would entail expenditures of US$3.9 million, or approximately 12% of the national budget.

Three types of comments were made on the proposed measures:

a. The repetition of grades in primary school is not necessarily bad; it could be considered a way of keeping children in school and of providing equal opportunities, since lower-income repeaters can remain in school and continue within the system.

b. The suggestion that resources be released by increasing the number of students per teacher and that repetition and attrition be reduced could be supplemented by a number of other measures designed to achieve greater internal efficiency in primary education. This has obviously been neglected thus far, since there is patent evidence of inefficiency, especially in the matter of the number of shifts.

c. A number of educators found the design and orientation of basic education to be inadequate, that is to say, that the external efficiency of the formal basic education system as an instrument of education and economic and social development leaves much to be desired. In this connection, it was recommended that that design and orientation should be changed to make more adequate provision for rural and underprivileged urban groups by adapting the curriculum to the needs of the home and the work place, that more attention be given to lower-income preschool children so as to facilitate their future general and educational development, and that greater efforts be made to overcome adult illiteracy through appropriate educational programs and instruments.

7. *Financing of rural education*

It is apparent that rural education receives scant attention in present-day Latin America. Yet development of this sector is increasingly important in solving the problems of Latin America's development. Hence the possible contribution of education to rural development, increased farm productivity, and better income distribution should be examined. Such analysis should take into account the socio-economic context, the structure and type of land tenure, and the concept of education, including both formal and nonformal instruction.

Different development models embody different concepts of rural education. Thus, in the neoclassical model of development the emphasis is on increased productivity by increasing input; in the dualist model, by reducing resistance to change; and in the heterodox model, by creating sharp contradictions within the existing structure. Moreover, recent literature shows that education offers greater benefits to farmers in a situation of change than in a static or traditional environment, and that extension services improve farmer productivity.

Analysis of the situation of a number of countries in the region shows that the relationship between expanded education and increased rural productivity, while positive, is not very significant. As a rule, the more modern the rural area, the greater the effect of education on productivity. This situation is regrettable in Latin America, because it is precisely the least developed regions that are most in need of investment in education, and least likely to show any perceptible impact.

But the fact that there is a correlation between education and rural productivity does not necessarily mean a positive relationship between education and increased income, since the agricultural sector does not reap the entire benefit of the additional income: much of it is appropriated by urban social groups, in part because of the prevailing price policies for agricultural products.

These results show the need for greatly intensified efforts by the various countries to improve education in rural areas. An ambitious program designed to raise the levels of primary and secondary rural education can absorb as much as 2 to 2.5% of GNP, as shown by the estimates for Colombia and Honduras and the Cuban experience.

Several additional points were brought up, including the need (a) to relate rural education to community wants; (b) to adjust regional and local study and training plans to labor market requirements; (c) to expand literacy training programs for adults; (d) to consider the problems of Indian populations; and (e) to coordinate formal and non-formal educational efforts.

Two important aspects of financing were also mentioned: (a) the results of the farm production centers, in the experience of certain countries, are not satisfactory as an additional source of income because of the low levels of technology and quality of the students; (b) use of external financing in rural education programs has given rise to important limitations because: (i) the technical construction specifications are not consistent with topographical, climatic, cultural and economic conditions in the areas in which the schools are built,

(ii) the system of international public bidding entails prolonged delays, and (iii) the procedures established reduce community participation in physical construction works and unnecessarily increase the local contribution.

8. *Technical education, vocational training and their financing*

The industrialization of Latin America that began in the forties called for the speedier training of skilled labor and middle-level managers to meet the increasing manpower needs of the sector.

The role of technical education, in particular vocational training systems in Latin America, was discussed. Generally speaking, the experience of the past 25 years in worker training features innovations in organization, financing, and the educational methods used. In countries where the average level of schooling is high, vocational training has become increasingly integrated into the formal education system. In other regional countries, however, teaching no longer follows the traditional approach. Vocational training institutions seem to be turning out a modern industrial proletariat with the skills and knowledge needed for using the most advanced technologies. On the other hand, they are open to students who are unable to complete their formal education in the traditional secondary school system.

In the opinion of some participants, the fact that most of the financing for the system comes from payroll taxes, discourages labor-intensive production techniques and promotes the use of more capital-intensive production methods. However, other participants pointed out that, given the low level of that tax (1-2%), its effect on employment is virtually insignificant and, in any event, that analysis is static and partial whereas it should be dynamic and balanced.

In addition, the evaluation of vocational training programs as a means of increasing the supply of trained labor in developing countries entails two further considerations: (a) the time needed for the training process in countries where capital is scarce; and (b) the social benefits accruing from investments in this type of process.

In general, it may be concluded that Latin American countries have found that short institutionalized vocational training constitutes a much more flexible arrangement for meeting short-term demand, and does not require massive capital investments or large budgetary allocations to be effective.

This approach prompted the following observations: (a) the analysis was more descriptive than analytical and therefore failed to fully answer such fundamental questions as: Who receives this sort of training?; In the final instance, who pays for it?; and Who benefits from its results?; (b) as to the rate of return on this type of training, it was pointed out that, according to some research, the rate of return on apprenticeship is similar to that on vocational training and (c) vocational training should be extended to the urban marginal groups and rural sectors.

On-the-job training is an alternative that, from the standpoint of resource allocation, would seem to have no obvious disadvantages; it could provide a decentralized way of imparting knowledge; and it could ease the task of financing by bringing prospective workers more directly into contact with companies needing applicants for this type of training, and thus ensure greater stability and utilization of the skills thus acquired.

9. *Higher education and its financing*

The social demand for higher education has continued to grow apace in Latin America. This has led to in-depth study of the share of that level in the resources allocated to education. Discussion today therefore centers on how long the State should continue to finance almost all the most expensive level of education to which only the higher and upper middle income groups have access.

Such analysis should take into account the fact that the university does not simply train human resources: it also performs social and economic functions essential to overall national development, such as conducting scientific research, developing and disseminating the cultural heritage, and serving as a forum for social criticism and discussion.

Thus a higher education financing policy should have the following objectives, as a minimum: (a) to reduce the State contribution to higher education, or at least contain its continued expansion; (b) to maximize the social rate of return on expenditure on this level, in accordance with evaluation criteria conductive to a more satisfactory allocation of resources to education as a whole and to the various levels and types; (c) to create conditions that foster real equality of opportunity and have a positive effect on income redistribution; and (d) to make the use of resources by universities more efficient.

Accordingly, alternative policies for financing higher education should be evaluated from the standpoint of its external and internal efficiency and its effect on equity.

In the light of the foregoing criteria, various elements and types of university financing policy were reviewed, such as payment of fees, educational loans (including subsidy mechanisms or scholarships), and a special tax on professionals. In this instance, an acceptable system appears to be one in which the direct beneficiary of higher education contributes more than at present to its financing through a special tax on professionals, supplemented by the payment of fees in higher education institutions and an efficient scholarship system. However, it was pointed out that the charging of fees could result in free or low-cost public universities becoming cheap universities for lower-income students.

Data supplied by four countries in the region supported the conclusion that the State contribution to the financing of higher education could be reduced by 10–30% while at the same time providing students from lower-income families with higher subsidies through one or another of the various alternatives cited, or possible combinations of them. This could be done without impairing the objectives of equity and efficiency, provided that the financing policy adopted made proper use of the instruments that would ensure simultaneous progress toward the stated objectives.

These considerations prompted the following comments: (a) an estimate of the cost of the social functions of the university at 50% of total university costs might well be excessive; (b) the flexibility of the approach became apparent when the various alternatives were combined according to the different socio-political contexts and objectives of the countries and considering that various instruments are necessary for achieving the proposed goals of efficiency and equity; (c) university attrition (emigration and professional unemployment) should be reduced through measures designed to equalize the private and social costs of university education; and (d) the charging of fees by State universities would not necessarily lead to the differentiation and stratification of a university system in the way descirbed.

D. Conclusions

The interchange of ideas by educators, sociologists, economists, official delegates, and experts in the area had proved fruitful and should be continued if the planning of the sector and the implementation of education policies are to be successful; to that end, coordination of the economic, social, and educational aspects of the sector was essential.

The share of national income allocated to the education sector might remain constant, although opinions differed widely in this regard; some participants expected it to increase and others felt that it might decline slightly.

In government spending and subsidies, the emphasis should be shifted in favor of elementary and vocational education, without prejudice to the need for subsidies to higher education. The extent of government financing of the different educational subsectors should vary according to a country's economic, cultural, and technological level and should therefore be determined by the individual country.

The internal efficiency of the education sector could be increased appreciably by changing the composition of the inputs now used to produce educational services and by creating and financing innovative projects that would use new teaching technologies and, in some cases, provide goods supplementing education. Such changes called for ingenious and unorthodox measures as well as considerable institutional flexibility.

The Bank should cooperate with beneficiary country governments in determining specific sectoral priorities consistent with the above-mentioned policy. This collaboration can take different forms of technical cooperation: the preparation of sectoral studies for determining priorities and specific projects, feasibility studies, and project evaluation.

By encouraging and promoting intra-regional technical cooperation, the Bank can facilitate an exchange of experiences, and of knowledge of the problems and the solutions found by the countries of the region.

To achieve the flexibility required by new educational policies, changes must be made in internal Bank policies to permit the financing of recurrent costs, of innovative projects—even though they entail a greater risk than traditional ones—and of buildings and equipment that, while less sophisticated, are better suited to the development level of the beneficiaries.

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CHAPTER I

Economic Theory as a Conceptual Framework for Analyzing the Problem of the Allocation and Financing of Resources for Education

***Francisco Elias Thoumi*[1]**

INTRODUCTION

Today, the educational systems of a large number of Latin American countries are subject to many social and economic pressures. Recent years have seen a great increase in both the total number of students and enrollment ratios. Among Latin Americans aged 15–30 years illiteracy rates have declined and the number of students enrolled in secondary and higher education has increased dramatically. In addition, expenditure on education has risen significantly in many Latin American countries; this increase has been not only in absolute but also in relative terms, since the percentage of both the gross national product (GNP) and of public expenditures absorbed by the educational sector has increased and thus exercises considerable pressure on both family and national budgets.

Unemployment in Latin America, especially in the urban sector, has also been high. In many countries, even highly educated persons are unemployed or underemployed in jobs in which they cannot realize their work potential. In a number of countries the emigration of highly qualified technical personnel has been substantial.

All these problems have led government authorities and students of public affairs to question the growth, structure, and financing of educational systems.

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Questions such as: What amount of resources should a country allocate to the education of its citizens? What kind of education should be provided? Who should pay for the education of each individual? have become very topical and form the basis of the Latin American educational problem. This paper discusses the conceptual frameworks that can be used to answer these questions and emphasizes in particular the contribution political and economic models can make to the subject.

A. CHARACTERISTICS OF CONCEPTUAL FRAMEWORKS

In principle, it is possible to design two types of conceptual frameworks for discussing and analyzing the problems of allocating resources to the different sectors of a country in general and to the educational sector in particular: those that emphasize the political aspects of government decisions and those that give precedence to the role of the market system in allocating the resources of a society.

What might be called the political conceptual framework views the resource allocation of a society as the outcome of the various political forces at play within it. Thus, the relatively high allocation of resources to the higher education sector in some Latin American countries is explained by the political power of students and professors who can affect the stability of any government that attempts to reduce the subsidy to this educational subsector. This approach defines the power structure of the country and explains the quota of power each politically organized group within society receives. This power quota determines the capacity of each group to influence the policies adopted by the government in a way benefiting the group concerned. Within this framework, the policy adopted by the government is the result of a compromise between the different pressure groups who in this way solve a conflict between opposing forces.[2]

Through such an analysis of alternative policies a government may determine the political cost of each measure it intends to carry out, for example, an agrarian or fiscal reform or an increase in customs duties, and could use the results either to prescribe economic policies that will maximize its popularity in the short term or increase the probability of the reelection of the head of state, or to achieve other goals. The political approach makes it possible for a government to determine what is feasible or realistic in political terms and, on this basis, to define a mix of policies designed to maximize a specific objective.

Despite the apparent realism of this approach, it may fail in practice because of mistaken perceptions of the political forces in society, since the individual members of a society can never have an exact idea of the power of each social group. Thus, policies that may appear realistic to some will appear unrealistic or utopian to others. The policy to be followed by a particular government therefore depends both on its specific aims and on its perception of the strength of the power groups within that society. Prediction of the policies a government will pursue calls for a knowledge of these two elements, which vary, among other things, according to who holds the decision-making power. Furthermore, this approach cannot be used to determine the amount of resources that should be allocated, generally, to each economic sector; however, it can explain why a specific government assigned a specified amount to a given sector.

When the economic policies of a government are defined as the result of the pressures exerted by political forces, these policies very probably result in very high economic costs for society. For example, the time horizon of politicians tends to be very short and they will therefore give preference to projects and policies that produce quick results and disregard policies or projects which, while of greater benefit to society in general, could produce results in the longer term.

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[2] This approach is common to students of politics: see, for example, (1) and (7).

The other possible approach to the problem of resource allocation starts by defining certain principles or assumptions that underpin a logical structure for deciding the amount of resources society should allocate to each sector. This type of axiomatic approach is common to many sciences, for example physics, mathematics, and economics, among others. All of them construct models that attempt to explain reality and, because they are based on assumptions, may lead to conclusions that do not fit reality. In the development of scientific thought these theories are refined, certain assumptions are modified, and certain theories are rejected when the empirical evidence contradicts the conclusions obtained.[3]

In allocating resources to the educational sector, it is possible to use a number of axiomatic approaches: one of them, which is rather simple, consists in defining a human right as a right that enables a person to participate actively and satisfactorily in society, for which purpose he needs at least a basic education that enables him to read and write adequately. This simple approach may be used to determine a minimum level of education to which every human being should have access by virtue of being human, but it does not make it possible to determine how much education each person should receive beyond the necessary minimum for functioning satisfactorily in society.

Another axiomatic approach, somewhat more complex, is provided by neoclassical economic theory. This theoretical framework is so far the only one that makes it possible to give specific replies to the questions posed at the beginning of this paper. Nevertheless, the replies given by neoclassical economic theory are limited in their applicability, since the theory does not cover all the situations that should be analyzed. However, it must be emphasized that this theoretical framework is the only one that makes it possible to analyze the problem of resource allocation generally, and to compare the advantages and disadvantages of each distribution of resources within a society.

The theoretical framework developed by the neoclassical theory of general equilibrium is rather complex, and this is not the appropriate place for presenting the model. Therefore, for the purposes of this chapter it will be enough to outline its principal characteristics and elements.[4]

B. GENERAL CHARACTERISTICS OF THE NEOCLASSICAL MODEL

The model analyzes the allocation of resources in a society in which there is a given number of goods and persons. A basic assumption is that people know what they want, that is to say, in the language of the theory, persons have perfectly defined utility functions. The amount of consumer and capital goods to be produced physically by society is limited by the existence of a specified number of factors of production. The technology used in the production of each good is known and determines unique relationships between the use of the productive factors and the amounts of products obtained. These relationships are known as production functions. The distribution of wealth is given by the allocation of the factors of production each individual has. The goal of society is to maximize a "welfare function", which is defined as the relationship between the satisfaction or utility of each individual, as viewed by him, and an index that measures the social "welfare". This relationship is such that, when the satisfaction of an individual increases without the welfare of any other member of society decreasing, the welfare of society as a whole also increases.

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[3] Many persons criticize the axiomatic approach in the social sciences, especially in economics, on the grounds that it makes unrealistic assumptions or leads to unrealistic conclusions. In the physical and chemical sciences, scientists have learned that, despite these shortcomings, it is essential to have theories and to use some of them even though they lead to unrealistic conclusions. Thus, for example, nobody criticizes Einstein's theory of relativity because it implies that time is reversible. However, many scientists are devoting their efforts to improving it.

[4] The interested reader is referred, for example, to the works of Bator (2) and (3).

Under certain conditions it is possible mathematically to determine the characteristics of an optimum that will maximize the social welfare function. These conditions include: the independence of utility functions, that is to say, the satisfaction of each individual must be independent of that of others; the absence, in the productive processes, of economies of scale or of external economies or external diseconomies[5] both in production and consumption, and the indivisibility of capital and consumer goods. Under these conditions, the maximum social welfare is characterized by: (i) each unit of a good must be transacted at exactly the same price; (ii) the marginal product of each input in each industry is equal to the price of that input; (iii) each consumer obtains amounts of goods such that the ratio between the prices of each pair of goods is equal to the ratio of the marginal utilities of those goods.[6]

All these conditions for maximization are satisfied when the economy has perfectly competitive markets. That is to say, it is possible to show that the conditions required for maximizing welfare under the restrictive assumptions mentioned are satisfied in a perfectly competitive economy. If these assumptions are valid, and if there is perfect competition, the government then has no reason for intervening in the market and affecting both the prices and the distribution of market resources. In the real world, the assumptions are not valid; however, it is possible to investigate how a change in the assumptions modifies the conditions of maximization that characterize an optimum distribution of resources. Thus, the theory has been extended to analyze certain situations in which different, more realistic, assumptions are made. For example, it is not difficult to ascertain the characteristics of an optimum when there are external economies in the consumption of a good, or when there are what are known as public goods such as broadcasting services, for example, in which, once they are produced, any individual may consume the service without other consumers having to reduce their consumption of the same good.[7] In addition, it is not difficult to identify the requirements characterizing optimal resource allocation when there are economies of scale or when there are both external economies and external diseconomies in the production of certain goods.

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[5] Situations in which the production or consumption of a good by an individual or institution has negative or positive effects on production costs or on the consumption of other individuals or institutions. For example, environmental pollution is an external diseconomy; a scientific discovery that makes it possible to reduce costs generates external economies.

[6] These conditions stem from the mathematical conditions of maximization of a continuous and differentiable function subject to some constraints.

[7] See, for example, Samuelson (9).

As a rule, when the above-mentioned assumptions are changed, the characteristics of the optimal resource allocation do not coincide with those of the equilibrium obtained in markets in which there is perfect competition. This gives rise to a theory of the optimum intervention of the government to modify the distribution of resources produced by the free market system.[8] This theory justifies government intervention in a limited and specific form; that is to say, it does not justify any government intervention in the market system but only those interventions, by means of public spending and tax and legal systems, that tend to bring the existing distribution of resources closer to the distribution that maximizes the welfare of society. The theory does not justify any kind of government intervention: it only indicates that the market produces a suboptimal situation and at no time does it show that the government is able to improve that situation; all it says is that by following optimal policies the government can improve the resource allocation of the economy.

The theory poses complicated problems of political economy when it is assumed that the distribution of the existing wealth is unjust from a moral point of view. In this situation, two types of policies might be recommended: first, that the government expropriate and redistribute wealth and then create an environment in which the price system can function efficiently; second, that it intervene in the price system to improve the distribution of wealth without expropriating any good. In addition, the two policies could be combined by using a partial system of expropriations coupled with interventions in the price system. Unfortunately, the neoclassical theory has no basis for providing criteria for choosing the most efficient way of redistributing wealth and, consequently, it is not possible, in terms of the theory of welfare, to evaluate *a priori* the advantages and disadvantages of using different policy alternatives to improve income distribution.

Generally speaking, it is possible to determine the optimum economic policy under the following conditions: (a) when the function to be maximized is given and (b) when the market does not lead to a social optimum as a consequence, among others, of the existence of imperfect markets, special characteristics of the productive processes, or as a result of the interrelations in the satisfaction levels of the consumers. However, it is not possible to determine optimum policies at a general level when the function to be maximized is modified by a change in consumer preferences, because the number of persons in society varies, or because the existing resource allocation is rejected as unsatisfactory.

The optimum policies derived from this theory imply that, when the production of a good generates external economies, that is to say, when it benefits sectors of society other than those that produce the good, the government should subsidize the production of the good. When it is possible to identify the beneficiaries, as for example in the construction of a highway, the funds for its construction should come from a tax on the direct beneficiaries of the highway. When it is not possible to identify the beneficiaries or the product benefits society in general—when, for example, the government takes steps to ensure national security—the theory prescribes the use of the general public revenue. When, in contrast, an action generates external diseconomies, such as environmental pollution, the government should levy a tax on the producer that is equal or similar to the cost of cleaning up the environment, plus the cost arising from compensating the individuals harmed by it; in other words, it is necessary to define a policy whose purpose is to ensure that the producer absorbs all the real costs of production and not that society pays for some of them.

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[8] See, for example, Bator (3).

C. FUNCTIONS AND CHARACTERISTICS OF EDUCATION

To determine the use of the neoclassical theory in the allocation of resources to the educational sector, the functions and characteristics of education must be analyzed.

Education has four functions: (a) it is an important factor in forming the values of the individual members of society; (b) it is a means of vocational and professional training; (c) it is an important element that determines the enjoyment of artistic and intellectual pleasures; and (d) it is a factor that affects the social and economic status of each individual. In terms of economic theory it may be said that education is a capital good, a consumer good, changes the utility function of individuals, and is a means used by society for distributing status and income.[9]

All these functions are performed both by the formal educational system and by non-formal systems and other institutions independent of the educational system, such as the church, the armed forces, political parties, the family, and the mass media.

Formal education tends to perform all the above-mentioned functions simultaneously, or as joint products, since each type of education combines the four above-mentioned elements.

Formal education primarily contributes, at the basic educational level, to the formation of the values of individuals; the purpose of this conscious contribution by educators is to train students to function satisfactorily in society and thus to reduce internal conflicts within it. It is undoubtedly a function that implies ideological indoctrination or, in terms of the theory of welfare, a process by which efforts are made to restrict and determine the preferences of citizens and consequently their utility function. It should be noted that many educators tend to regard this function as the most important function of the educational system.[10]

Education also helps to form individuals who are useful to society, not only because it transmits the values of society to them but also because it teaches them to perform specific tasks, to render services, or simply because it teaches them how to learn. Education increases human capital and therefore is part of the individual and social capital formation process. This capital may be used in the production processes of society: factories or offices or, more generally, in the daily life of each individual, insofar as the individual learns to function in society. It is to be noted that the more complex a society is, the greater the amount of human capital needed for operating in it without creating external diseconomies, that is to say, without an uneducated individual being an obstacle to its normal operation.

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[9] Using a different terminology, sociologists and educators divide the functions of education into four categories similar to those mentioned here. See, for example, Rama, G. 1978 (8).

[10] See, for example, (8) p. 307.

Furthermore, education is regarded as a consumer good because it increases the satisfaction of the student, independently of other advantages, and because it improves the life of the individual by giving it, theoretically, more meaning. Certain types of education have a larger consumption component than others; thus, the fine arts, music, and literature have a larger consumer good component in these terms than carpentry or engineering.

Education confers social status on the person who receives it. The status conferred by formal education depends both on the level of education obtained by the individual and on the number of individuals that have completed the same level. Thus, in a country where illiteracy is high, elementary education confers a much higher status than in a highly educated country. Because it confers status, education is a positional good, that is to say, a certain status in society is assigned to a person who has a specified level of education.

The importance of education as a positional good is positively related to the effectiveness of the system in restricting access to that good. The greater the importance attached to the good, the greater the probability that it will be imitated and the greater the pressures exerted by persons that seek access to it. For example, in Latin America heavy pressure has been exerted for increasing the number of university places and consequently new universities whose courses are substandard have been established. This demand is explained in part by population pressure. However, this single factor cannot explain the educational expansion in courses for professions in which there is a high level of unemployment and underemployment, an expansion largely due to the positional nature of education.

Some authors discuss what would appear to be a fifth function of education; in this case, they mean the possibility that it acts as an agent of social change. However, this characteristic of education is included in the four functions discussed above. For example, education acts as an agent of social change by introducing new ideas into society, through its value-forming function. It also does so by generating an individual distribution of wealth and social stratification different from those already extant. These situations are covered in the foregoing classification.

Higher education may be closely related to research, so much so that many authors consider it impossible to have effective graduate programs unless the professors and students conduct research projects.[11] From this point of view, graduate education and scientific research are two products that are produced concomitantly by the university system and whose costs cannot be separated.

D. APPLICATION OF THE NEOCLASSICAL THEORY TO THE STUDY OF THE ALLOCATION OF RESOURCES TO EDUCATION

Although this application is limited, the criteria for resource allocation derived from the welfare theory may be used to analyze some of the functions of education.

The allocation of resources to an activity designed to form the values of the members of a society cannot be decided by using the welfare theory. The creation of values is similar, in terms of the neoclassical theory, to an attempt to restrict the possible utility functions or preferences of individuals to those desired by government authorities, parents, religious or military leaders. The neoclassical theory assumes that utility functions are given; it does not explain how they are formed nor does it make value judgments on the desirability of one utility function over another. If an economist asks how much a society should spend on forming the values of its citizens or on producing individuals with utility functions that have certain specific characteristics, the only honest reply that can be given is: I do not know. In other words, the economic models developed so far cannot answer these questions.

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[11] See Boeninger's paper, Chapter XI of this book.

The allocation of resources for consumer or capital goods is easy to analyze at the theoretical level, since that thinking is more developed. In this area, economic theory has an important contribution to make by analyzing the amount of resources allocated to education in general and to each educational level in particular.

Economics again encounters difficulties in analyzing the allocation of resources for producing a good that distributes status. Status as such is not included in economic theory; in principle, there is no economic theory that makes it possible to determine the optimum amount of status or, rather, the optimum status structure of a society. Consequently, economic theory cannot decide what resources should be allocated to education in its function as a distributor of status.

Despite the foregoing limitations, there are many contributions economic theory can make to the analysis of the allocation of resources to education.

First, the economist contributes to the study of the internal efficiency of each branch of education, that is to say, to the analysis of the productive factors used in the different educational processes and systems. By using the theory of production economists can determine the optimization conditions for obtaining a certain product at the lowest social cost. Thus, studies of this nature made by ECIEL show that, in many schools, an increase in the number of books available, or other inputs, would make it possible for the same teacher to obtain a much higher output.[12] That is to say, that the combination of factors used in obtaining a specified educational product is inefficient.

Second, studies on the rate of return of the different educational subsectors indicate the relative productivity of each subsector as a producer of human capital. This information is undoubtedly useful. Thus, for example, if it is shown that the social rate of return on elementary education is 20% while that on higher education is 5%, the politician who is in a position to take decisions must have other reasons, such as social mobility and change, for advocating more emphasis on higher education. In this case, it is important for the economist to point out to the politician that his decision is taken even though the rate of return on elementary education is four times that on higher education.

Third, while the economist does not have theoretical frameworks that enable him to evaluate the contents of education in relation to the formation of values, he can evaluate its contents insofar as it attempts to create human capital. Thus he can compare different types of professional education, such as the training of physicians who are experts in complicated procedures as opposed to the training of paramedical personnel capable of using simple methods to diagnose and treat common diseases in a specified country.

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[12] Claudio de Moura Castro and Jorge A. Sanguinetty (6).

Fourth, in some cases in which there is a clear waste of accumulated human capital, as reflected in high unemployment or underemployment of professional personnel or in the emigration of professionals to other countries, the economist can quantify the social cost of these phenomena and thus enable the politician to compare that cost with other possible effects of the phenomenon studied.

Fifth, in terms of the welfare theory, a subsidy to education is justified only when it generates sufficient external economies to enable society in general to recover the cost of the subsidy. That is to say, when the benefits received by society in general, independent of the benefits received by the person educated, are at least equal to the cost of the subsidy. The economist can attempt to measure these external economies and thus obtain at least a specific idea of the size of the subsidy, without taking income distribution reasons into account.

Sixth, the economist can also evaluate both the effect of education on income distribution and the effectiveness of education as a factor of social mobility; thus, he can evaluate the success or failure of many subsidies and programs originally created for distributive reasons.[13]

Seventh, since education is a positional good, the economist can estimate the cost of using this good for distributing social status. If this cost is very high, the politician must then weigh the benefits of using education as a positional good against the costs estimated by the economist.[14]

Eighth, since graduate university education is produced concomitantly with scientific research and since this fact has been used to justify government subsidies to universities, the economist can evaluate the justification for the subsidy. In most cases, the more applied research is, the stronger the argument that it be financed by the productive sectors that benefit directly from it; the more basic research is, the stronger the argument that the government should subsidize it, since its benefits are going to be more general.

E. CONCLUSIONS AND FINAL REMARKS

Everything considered, it may be concluded that, although economics cannot give an absolute answer to the problem of allocating resources in the educational sector, it does make it possible to study many of the implications and effects of different policies for educational expenditures and educational subsidies. In addition, the economic analysis of education makes it possible to analyze alternative procedures for achieving similar results at lesser costs or for obtaining better results with the same costs.

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[13] Studies of this kind tend to be interesting although somewhat inconclusive because the statistical analysis lends itself to varied interpretations. For example, in the United States, whether education is really a means of social mobility is a matter of dispute. The neoclassical economist emphasizes the fact that income is highly correlated with educational level, in order to show that education is indeed a means of social mobility. Radical economists argue that education is highly related to the social status of the parents of students and, consequently, education simply replicates the social structure from one generation to another (see Becker (5) and Bowles (4)).

[14] This is an important point, especially in situations in which more and more education is needed to distribute status. For example, status, which today is associated with obtaining a university degree, is similar to that associated a couple of generations ago with a secondary school diploma and a couple of centuries earlier with the ability to read and write. In other words, when the average educational level of society increases, more education is needed to obtain a given status level; that being so, education has gradually become an increasingly expensive means of distributing status.

The application of economics to education is limited. However, economics is the only discipline that makes it possible, albeit imperfectly, to analyze the problem of educational expenditures in a framework that covers the costs and the benefits obtained by each social group and makes it possible to determine an optimum, although it may be limited. The other disciplines—political science and education, anthropology or sociology—have not developed models for evaluating the social desirability of different allocations of resources to the educational sector. Some of these sciences can explain why a society devotes a certain quantity of resources to education, but none of them can say what the appropriate amount is. In the foregoing discussion we have repeatedly stated that the politician in power should take the final decision in the light of the contribution of the economist. However, the fact is that the politician does not have a single theory; in making a decision he takes into account other criteria that can sometimes weigh more heavily than the economic decision alone. Similarly, when these decisions are in the hands of educators, they tend towards overspending since they attempt to obtain a better technical result without taking into account the benefits society might obtain from using the same funds in other sectors. As a matter of fact, economics is the only discipline that today provides us with a theory, albeit an imperfect one, that enables us in a world of limited economic resources to compare the benefits of allocating those resources to different sectors.

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CHAPTER II

Characteristics of the Educational Sector in Latin American Countries[1]

INTRODUCTION

This chapter analyzes the principal characteristics and tendencies of educational development in the region in the mid-1970's, the efficiency of its educational systems, and the impact of educational outlays on income distribution. It also examines several alternative ways of financing increased educational expenditures that were dealt with in some detail in the papers of the 1976 and 1978 seminars in Washington and Mexico City, respectively.[2]

In addition, certain traditional indicators of the educational system are described and topics of special importance, such as internal and external efficiency and the contribution of education to equity in income distribution, are discussed, all as analytical categories that influence economic decisions, to the end of orienting the design of strategies for the allocation of resources to the sector.

This presentation is divided into three parts: the first describes the state and level of educational development in Latin America;[3] the second deals with problems of equity and efficiency; and the third discusses alternative methods of financing the sector and its real possibilities of expansion.

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[1] This chapter was prepared by Rolando H. Castañeda and Maritza Izaguirre P., of the Economic and Social Development Department of the Inter-American Development Bank, with the cooperation of John Elac, Lucia Pinedo B., and Francisco E. Thoumi.

[2] The information on which this analysis is based is drawn primarily from the studies prepared for the two seminars on the financing of education sponsored by the Bank. In addition, information derived from the studies made by ECIEL, financed in part by the Bank, has been used, as have been other investigations, also sponsored by the Bank, whose purpose was to gain a better knowledge of the costs and financing of education in Latin American countries. Wherever possible, statistical data extracted from the statistical yearbooks of UNESCO and OAS for 1974, 1976, and 1977 have been used.

[3] In this paper, the term "Latin America" encompasses all the regional member countries of the Bank, including the English-speaking Caribbean countries.

A. STATE AND LEVEL OF EDUCATIONAL DEVELOPMENT IN LATIN AMERICA

To measure the level of educational development of the countries, two of their characteristics have first been analyzed: literacy rates and coverage in the three main levels of education. The data show that the degree of educational development, the magnitude of the efforts to achieve it, as well as the policies adopted to that end, appear to differ considerably. Some countries have concentrated their efforts on expanding the base of the educational pyramid, while others have placed greater emphasis on the apex.

Thus, in the period 1950-1970, there was a slow but sustained decline in illiteracy rates for the population aged 15 years and over (see Tables II-1 and II-2).[4] Nevertheless, much remains to be done in this area since, around 1970, one-fourth or more of the population over 15 years of age in 11 countries was illiterate. At the beginning of the 1970's the percentage of illiterates 15 years of age and over ranged from less than 10 in Argentina, Bahamas, Barbados, Guyana, Jamaica, and Trinidad and Tobago to more than 50 in Guatemala and Haiti.

The differences between the countries are clearly shown, for example, in Tables II-1 and II-2, where it will be seen that the percentage of illiterates in the population 15 years and over in Barbados was 0.8 in 1970 whereas in Venezuela it was still 24.1 in 1971. The share of the gross national product (GNP) in Barbados allocated to educational outlays—6.9%—was the second highest in the region in 1975; that of Venezuela, 5.4%, ranked sixth in that year (see Tables II-3 and II-4).

The countries appear to have focused their efforts on basic formal education and consequently to have assigned lower priority to the literacy training of adults; as a result, in most cases the illiteracy rates are higher among adults than in the age group 15-18 years. This difference tends to be greater in countries with high illiteracy rates and is due to a number of factors: (a) it is easier to educate children by expanding the formal education system than to carry out efficient adult education programs; (b) many of the countries lack an institutional structure, financial resources, and a firm government commitment to undertake adult literacy training campaigns; and (c) in countries that conduct such campaigns, they are not always geared to the characteristics of the marginal groups that speak Indian languages, the rural areas, or the needs of adult women.

In the past decade, there has been a sharp increase in the enrollment ratios of all three educational levels and particularly of the secondary and post-secondary levels (see Table II-5, Gross Enrollment Ratios). Nevertheless, the figures for 13 countries show that, with the exception of Argentina and Chile, between 10% and 30% of school-age children (7-12 years) were out of the school system in the 1970's (see Table II-6). These figures are national averages and it is therefore to be assumed that, in rural areas and the lower-income groups, the percentages were even higher.

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[4] For the tables mentioned in the text, see the statistical appendix at the end of the chapter.

No figures are available for age-specific coverage in the rural sector; however, a comparison of illiteracy rates for the age group 15–19 years in the rural areas and in the capital cities of nine countries (see Table II-7) shows that the percentage of illiterates in this age group was between 4 and 13 times greater in the former than in the latter. These figures suggest that coverage is lower in rural areas owing to the difficulties of providing education there, among other reasons because teaching personnel prefer to live in cities and because of the higher costs entailed in providing good quality education in that sector.

The educational coverage of the Indian populations also present problems: these are particularly difficult to solve because of cultural, linguistic, and other differences, possibly caused by the discrimination to which those groups have been exposed for several centuries. Even the United States now has problems with the enrollment of some of its minorities.

According to the available statistics, even though 54.5 million students were enrolled in primary education in 1975, compared with 25 million in 1960, the annual cumulative growth rates declined in most of the countries (in 19 as against 4) in the periods 1965–70 and 1970–75[5] (see Table II-8). According to a study by Jallade (see Chapter III of this book), this growth rate is expected to continue to decline.

In secondary education the above-mentioned growth rates declined in 13 and increased in 10 of the countries in 1970–75 compared with 1965–70 (see Table II-9). There are substantial differences in enrollment at this level between the countries and between the four years considered (see Table II-5).

The growth rate of enrollment in post-secondary education, from 12.7% to 17.0% for the periods 1965–70 and 1970–75, respectively, increased in 10 countries in the second period compared with the first and declined in 11 of them, although in those countries it remained relatively high (see Table II-10).

The different degree of educational development of the countries appears to be reflected in the relative growth of the three educational levels. Thus, for example, in countries with an average illiteracy rate, such as Panama and Peru, there is a much higher percentage of adults with post-secondary education than in Argentina, Barbados, Jamaica, and Trinidad and Tobago, which have relatively low illiteracy rates (see Table II-11).

Countries such as Bolivia and El Salvador, which have very low gross enrollment ratios at the secondary and primary levels, have a higher proportion of university students than countries whose primary and secondary educational are more developed (see Table II-5).

The gross enrollment ratios at the secondary level range from 8% in Haiti to 77% in Barbados. The English-speaking Caribbean countries, which have focused their efforts on expanding the base of the educational pyramid and adopted strategies similar to those of the European countries, have in most cases achieved levels of development of their primary and secondary education that are higher than the average, whereas their enrollment ratios at the higher level are low.

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[5] The growth rate in the period 1970–75 was adjusted to take into account the change in the duration of primary and secondary education in Brazil in 1971.

This fact becomes even more evident if we examine Table II-6, where the age-specific enrollment ratios for 13 countries show considerable variation both between countries and between ages.

Thus, Argentina enrolls more than 95% of the children between 7 and 12 years, whereas Guatemala is able to enroll barely 50% (see Table II-6).

The problems of repeating (repeaters), attrition (dropouts), and grade level retardation (overage) are indicators of the level of development of the educational systems and have a strong impact on their coverage capacity.

In Latin America, the figures for enrollments in the primary educational level reflect the following problems of repetition and retention: (a) in all the countries, the distribution of enrollment in primary education shows that more children are enrolled in the first grade than in the following grades, which points to very high dropout and repeater rates in the first grade. Indeed, the repeater rate in that grade is higher than in the other grades and is as much as 33% (see Table II-12); (b) the retention rate in primary education (that is to say, the ratio between students that complete it on schedule and those that begin it) is very low, 37.5%; it ranges from 57.6% in Uruguay to 19.4% in Nicaragua and is substantially higher in urban areas than in rural areas (see Table II-13). A study of the series of these variables shows that, although there is a downward trend in repeater and dropout rates, they are still high. This decline may reflect qualitative improvements in teaching or the institution of automatic promotion at the elementary level in some countries of the region.

As a matter of fact, there is no consensus about the complexity of the problem of repetition and its causes. However, it is recognized that this problem is largely due to the precarious physical and intellectual development of poor children in their preschool years, which places them at a disadvantage with respect to children from more favored sectors for whom the educational systems are designed.

It should be pointed out that, despite the above-mentioned advances and efforts, the picture presented by educational statistics is possibly more favorable than the actual situation in the countries. For example, educational attainment data cover students enrolled, not those that actually attend school and, therefore, mask the absenteeism and attrition that occur continuously in the educational systems. Nor do those data reflect the performance of students in relation to the goals of the programs. In Brazil and Mexico, attrition, absenteeism, and substandard performance indicate that enrollment data overestimate actual school attendance by between 23 and 54% (6, pp. 231–240).

As a result of the rapid expansion of enrollments in the three educational levels in Latin American countries, expenditure on education is growing at an even faster pace than that of GNP. Of the total number of countries in the region for which information is available on public expenditure on education as a share of GNP (see Tables II-3 and II-4), eight spent less than 2% of GNP on education in 1960 and none spent more than 5%. In 1975, only three spent less than 2% and several spent more than 5% of their GNP.

It follows from what is said above about the coverage of school systems and the expenditure level it implies that there are considerable differences between the countries as regards their levels of educational development—which is not necessarily associated with their levels of economic development[6]—and also as regards the degree of relative development of the various educational levels (see Table II-14). These differences are probably the result of the educational and social policies pursued. To ignore the existing differences means to ignore the fact that some countries have achieved a good level of development of their primary education and that in the immediate future the efforts they need to make must primarily be qualitative efforts as well as efforts to extend the educational base to other levels. In other countries there is clearly a relatively lower development of primary education and, there, greater efforts can surely be made to universalize primary education.

B. PROBLEMS OF EQUITY AND EFFICIENCY

1. Impact on income distribution of public expenditure on education

Although public outlays on primary education and its financing have an important redistributive potential, public expenditures on education in Latin America, contrary to the expectations that prevailed at the beginning of the 1960's and the considerable expansion they have undergone, are not helping to make income distribution more equitable. These expectations were possibly based on the fact that there was a close relationship in the region between the educational attainment index of the economically active population and that of the concentration of income distribution: the coefficients of determination between the index for the concentration of income distribution and years of schooling of the economically active population and the proportion of economically active population with no schooling amounted to .803 and .794, respectively (see Table II-15).

Although the impact of public education expenditures on the distribution of

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[6] Only 43% of the variance of the gross enrollment ratios in secondary and higher education were explained by the GNP per capita in 1975. In addition, when other variables such as urbanization and enrollment in the immediately preceding level are introduced, those variables were not significant at a confidence level of 90%. Specifically, secondary education is explained by the GNP per capita through the fitted equation,

$$\text{Secondary} = 13.029 + \frac{0.0238}{(.0065)}\,\text{GNP}_p. \qquad R^2 = .4288.$$

Some countries that have a larger margin of error with respect to this equation are Guatemala (it has a gross enrollment ratio of 13%, which, according to the equation based on its GNP per capita, should be 31.6%) and Guyana (it has an enrollment ratio of 47%, which, according to the equation based on its GNP per capita, should be 27.1%). Higher education is explained by the following equation:

$$\text{Higher} = 1.314 + \frac{0.00969}{(.0026)}\,\text{GNP}_p. \qquad R^2 = .4297.$$

Of the extreme departures from this equation, the most notable were Bolivia, whose enrollment ratio of 10.1% should, according to its GNP per capita, be 5.7% and Trinidad and Tobago, which, according to its GNP per capita, should have an enrollment ratio of 14.3%, not of only 3.4%.

income in the region cannot be accurately determined, the incomplete statistical information available and its analysis at least suggest that, instead of tending to substantially improve income distribution in Latin America in the short and long term, such outlays have the opposite effect in some countries and may even have helped to worsen it. For example, a study by Jallade (10) shows that the Government of Brazil tends to favor lower-income groups through subsidies to students and the taxes it collects from those that work, but this effect is canceled out by the unequal distribution of educational opportunities among the various social strata. Thus, the higher income social groups receive a relatively higher proportion of public outlays on education, which further accentuates the unequal income distribution. This conclusion is also shared by Langoni (11), who is of the opinion that the worsening of the distribution of educational opportunities was one of the causes of the worsening of income distribution in Brazil between 1960 and 1970.

With respect to the distributive effect of educational outlays and their financing by educational levels, two studies for Colombia conducted by Jallade and Selowsky show that public outlays on primary education are highly progressive, a characteristic that diminishes in secondary education and becomes regressive in higher education.

For higher education in particular, it was found that a high proportion of the students belonged to the higher and the upper middle income sectors; in only a few countries was there a sizable proportion of youths from the middle class in general. For most low-income students the opportunity for post-secondary education was limited; since education is provided at token prices and the real cost is borne by public funds, this service has a regressive impact on income distribution rather than furthering more harmonious development of the community.[7]

A study by Filgueira (8) shows that both years of schooling and institutional educational expenditures were better distributed in 1970 than in 1960, although they still represented a high degree of inequality (concentration) when measured by the Gini coefficient. Inequality was greater for institutional educational expenditures than for years of schooling (see Table II-16), and even greater than the degree of concentration of income in some countries. These inequalities are accentuated by the quality and type of educational services available to the various income groups.[8]

The studies made show that, if public outlays on education are to have a favorable effect on income distribution in the long term, the share of educational expenditures received by low-income families must be proportionately greater than that of high-income families and that the rate of return on those expenditures for low-income families must be greater than for high-income families. This is not so in the region. On the one hand, the educational attainment of the poorer families is much lower than that of richer families and the unit costs of secondary and higher education are much greater than those of basic education. In addition, unit costs and institutional expenditures on basic education are higher for high-income urban families than for low-income families in shantytowns and rural areas. The result is that expenditures on education for richer families are significantly higher than those for poorer families.

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[7] These studies examine how educational outlays are distributed by socio-economic strata and which strata finance public outlays on education, that is to say, they analyze both who receives and who finances education. See (9) and (16).

[8] "There is a substantial and in some cases dramatic difference in the characteristics of public schools attended by different social classes. The schools attended by the poor have the worst teachers, the highest student/teacher ratios, and the highest group/teacher size; the buildings are more run down, dirtier and less well equipped." (6, p. 253). "Thus there is no way of escaping the conclusion that there is a high degree of regressivity in Latin American educational systems. The groups and sectors that are worst served are precisely those whose socio-economic position is the most disadvantaged." (6, p. 254).

Furthermore, there is empirical evidence that the rate of return on outlays on primary education is usually higher than those on secondary and higher education (see Table II-17). Nevertheless, in some countries the rate of return on primary and secondary education varies considerably according to different income brackets, in favor of the children of higher-income families (see Table II-18),[9] because repeater and dropout rates are higher in lower-income groups.

One aspect that warrants emphasis is the fact that access to public education in Latin America is usually free or tuition is nominal, that is to say, virtually completely subsidized, in the three educational levels. This, coupled with the fact that the children of high-income families usually remain in the educational system longer and that the costs of secondary and higher education are usually higher than the costs of primary education, implies that higher-income families receive a much greater educational subsidy in absolute terms than poorer families (see Tables II-19 and II-21).

In addition, certain private costs of education—expenditures on books, supplies and materials, uniforms and transportation not covered by the schools—entail a greater effort for low-income families than for high-income families. As a rule, these expenditures amount to one quarter or one third of the unit costs of education. In certain cases, expenditure on transportation alone is equal to the unit expenditures of the school (6, p. 258). The scholastic achievement of students from lower-income families may be impaired, and even their attendance at school compromised, by their inability to bear the high private costs associated with public schooling.

Furthermore, the income forgone by the poorer families, that is to say, the opportunity cost of the time sacrificed by the student by remaining in the educational system, is significantly more important for them than for higher-income families.

The studies of Jallade (9) and Selowsky (16) for Colombia show that the net result of government action in education has a slightly positive effect on income distribution in the short term. This is so because the relation between the subsidies for basic education received by low-income families and the taxes they pay is higher than that for medium and high-income families (see Table II-21) despite the longer years of schooling in secondary and higher education of the latter. However, the situation in Colombia is very special, since a high percentage of the children of high- and medium-income families primarily attend private schools and thus receive smaller subsidies for secondary and higher education. Recent statistics from Colombia show that 46.5% of the secondary education and 50.5% of the higher education is provided in private institutions.

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[9] Repeating and attrition substantially increase economic costs by giving rise to what may be called a "cost overrun" and, consequently, a waste. In Brazil, these overruns ranged from 22.6 to 54.5% for the primary education system in six regions, the unweighted average being 42.1%. In Mexico, the overrun is 50% in the federal primary subsystem (6, pp. 238-239). In addition, the considerable social cost of this waste in terms of the self-esteem and self-confidence of the repeater, the dropout and the over-aged should be emphasized.

Some of the assumptions of these studies are debatable, e.g., that unit costs are the same for all students whether they attend the most prestigious school in the capital city or an unprivileged school in a shantytown or a rural area. Also ignored is the greater impact on poorer families of the private monetary costs and opportunity costs involved in sending children to school and the fact that the private benefits of education are related to obtaining a diploma. Poorer students drop out of school more frequently and therefore do not obtain a diploma.

The regressive distribution of subsidies to higher education is a consequence of the unequal access of the different social strata to this educational level, a discriminatory selection process that takes place in the primary and secondary levels of education. Accordingly, there is little that higher education by itself can achieve in the matter of equality of opportunities. The fact that higher education is free of charge is not sufficient to enable low-income students to obtain access to it and to remain in it; they have to pay their subsistence costs and the income forgone by them, or opportunity cost, may be essential to their families.

A study by Schiefelbein and Andraca (17) on Chile shows a significant correlation between the school in which students pursue secondary education and the score obtained in the university entrance examination. Of the students from private secondary schools, 55.8% obtained more than 600 points compared with only 25.5% for those from public schools. In addition, 48.4% of the students from public schools obtained scores of under 500, as opposed to only 14% of the students from private schools.

Accordingly, the information examined indicates that public expenditures on education has been, at least in a number of countries, regressive and discriminatory as far as low-income families are concerned. Furthermore, the studies point to a clear subsidy for secondary and higher education in favor of medium and high-income urban families.

2. Efficiency of educational systems

Since educational expenditure represents between 2 and 5% of GNP in most of the countries, a number of studies have analyzed the concept of efficiency in relation to that expenditure.

In view of the interest of the countries of the region in maximizing the contribution of public expenditure on education to economic and social development, especially because of the perceived difficulty in increasing this expenditure in the near future, this section will be devoted exclusively to a detailed discussion of two aspects of the efficiency of the educational systems of the region: (i) the fact that by maximizing the use of the resources available a system could release funds for increasing its quantitative coverage and improving the quality of its functions (this is known as the internal efficiency of the educational system),[10] and (ii) the fact that these resources should be used in the best possible way in preparing the human resources society needs, which is usually known as the external efficiency of the system.

From the point of view of the policy of allocating resources to the sector, internal efficiency makes it possible in the short term to release resources for reallocation to other purposes either at the same level or between levels or to other areas of social development. On the other hand, external efficiency contributes in the longer term to development in general, since it increases the social yield of educational expenditure and helps to generate greater production.

The studies of the Educational and Development Project the Bank has financed through the ECIEL Program show that the internal efficiency of elementary education in Latin America is very low. There are certain basic education inputs—the most expensive among unit costs—such as teachers and classrooms, which are frequently underutilized. There are other supplementary inputs of the minimum necessary facilities—the least expensive among unit costs—such as cost of repairs, cleaning of existing facilities, blackboards, books, desks, chalk, maps—that are generally in short supply and of poor quality. These deficiencies, which are substantial in the different countries studied, are more evident in basic schools than in secondary schools and in rural areas and shantytowns than in the cities.

The Education and Development studies show that there are many schools in the region in which teachers and classrooms are not used, in which only one school shift is taught, or where the student/teacher ratio is very low, while in many other communities a lack of teachers or classrooms prevents children from completing primary education.[11]

Consequently, if the teachers and schools were used more efficiently, it would be possible to increase the coverage of the system, since at least the repeating, grade level retardation, and attrition of many students that leave the educational system because of lack of complete schools could be avoided.[12]

It is also believed that elimination of the idle time of some teachers would produce a significant reduction in school expenditures, perhaps in the order of more than 20 to 30% in some of the urban subsystems studied (6, p. 256). According to that investigation, the qualifications of the school principal has a considerable effect on costs, since better qualified principals are associated with lower costs per student.

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[10] The term "internal or administrative efficiency" is used to refer to the most appropriate or optimum ways of using the existing resources within the framework of the technologies available. As the educational system becomes more efficient, it will need fewer resources to achieve its present objectives and consequently it will be able to achieve additional objectives within the same public budget. The degree of inefficiency is therefore defined as the difference between what is achieved with the resources available and what could be achieved if they were used efficiently.

[11] For example, according to Schiefelbein (18) in 1974 about 82% of the basic urban schools in Chile taught the complete elementary education cycle, as against only 13% of the basic schools in rural areas. In Paraguay, in 1974, 19% of the rural schools provided education through the second grade, and 35% through the fourth grade.

[12] A recent official study for Paraguay, for example, states that if the student/teacher ratio were increased from 29 to 40, it would be possible to serve 50% of the out-of-school students (18, p. 103).

The ECIEL studies also show that even those schools that have certain minimum facilities or supplies (such as maps, blackboards, chalk, building repairs, cleaning, etc.) often have facilities (workshops, sports fields, etc.) that are not used because they lack additional inputs. This has an adverse effect on the attractiveness of the school and consequently on student performance. In a poorly maintained school that has inadequate health and hygiene conditions and a generally unpleasant environment studies cannot be pursued very efficiently, which frequently has a negative effect on certain behavioral traits the school should help develop.[13] The more restrictive administrative procedures for controlling expenditures are applied, precisely, to the supplementary expenditures that only absorb between 5 and 10% of the total budget. In contrast, they are not usually applied to the main expenditures.

In most cases, especially in rural areas and shantytowns, the basic schools lack workshops in which the students can be taught certain subjects and minimum skills for dealing with the environment in which they live and increasing their work productivity.

With respect to external efficiency, the consideration that the educational system must be geared as best as possible to preparing the human resources society needs takes on special importance in Latin American countries.

The economic development strategy followed by most of the countries of the region from the end of the Second World War until the beginning of the 1970's strongly emphasized economic growth based on the accumulation of physical capital and industrialization aimed at import substitution. It was believed that, with the strategy, the effects of this growth would eventually trickle down to the population as a whole and improve income distribution.

In that period very high overall and per capita economic growth rates and very high physical capitalization growth rates were achieved, and industrial expansion was substantial.[14] Thus, in the period 1960–77 the annual cumulative growth rate of the gross domestic product (GDP) in real terms was 5.8% and that of the GDP *per capita*, 2.9%.

Between 1960 and 1976 gross capital investment as a percentage of the GDP and the contribution of manufacturing to that GDP were as follows:

Year	*Gross Investment GDP (%)*	*Product of the Manufacturing Industry/GDP (%)*
1960	9.9	26.7
1976	22.7	26.7

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[13] A number of studies have found that the influence of the socio-economic level of the family is the most important explanatory variable in student achievement and educational attainment. Other measures designed to improve the quality of key inputs are usually not as important in explaining achievement, especially at the primary level and in the early years of the secondary level (1). However, this does not mean that these inputs are needed to obtain greater achievement.

[14] The statistical data in this section were extracted from the statistical appendix of the annual reports of the Inter-American Development Bank on economic and social progress in Latin America.

In contrast, it became evident that the expected effects on income distribution and elimination of extreme poverty were not achieved in most of the countries of the region.

As already pointed out, the educational system and public expenditure on education have expanded substantially. Furthermore, one indicator—gross enrollment ratios—has increased from an average of 85% for primary education in 1960 to 97% in 1975; in secondary education, the ratios almost doubled, from 21 to 37% in the same period. In post-secondary education, the growth was much more marked (from 3 to 10.6%). However, despite the behavior of that indicator, there are still problems, as has already been seen, of coverage and quality of education, which are explained in part by the development strategy followed. Jallade (see Chapter III of this book) points out that, when that strategy was aimed at industrialization and economic growth, especially the accumulation of physical capital, it was reasonable for the increased resources of educational systems to be used primarily for preparing professional personnel, skilled workers, and technicians and high and middle-level managers in the large urban centers because this development strategy called for such manpower. Accordingly, it was to be expected that the growth of secondary and higher education would be greater than the growth of primary education; that technical and vocational education would focus on preparing skilled industrial workers and middle-level managers; and that the preparation of agricultural technicians and rural education in general would be neglected.

It should be borne in mind that, at least in some cases, the level of schooling of the labor force has raised the qualifications demanded for certain jobs, especially in government and in major industries.

A number of studies[15] emphasize the absence of technical and vocational education programs for the manpower employed in the agricultural sector in Latin American countries and contrast it with the technical and vocational educational facilities that have been developed for the industrial and service sectors. Training programs in agriculture would be of special importance, since, generally speaking, formal education has not been tailored to the requirements of the rural sector and consequently knowledge and skills relevant to that environment have not been provided. However, if these programs are to be successful, one of the essential conditions is that they be designed as part of a general strategy for the development of the sector.

From the economic point of view, there would appear to be good reason for instituting technical and vocational programs in agriculture, since evaluations of them have usually shown high rates of return.

It is difficult to analyze the case of higher education because it not only contributes to the process of manpower training, but also a substantial part of the expenditure allocated to the sector goes to other functions, for example, the generation of new knowledge, technological innovation, or adaptation of new procedures to specific conditions, elements that are not easily quantifiable.

Furthermore, and because of its special characteristics, higher education consumes an increasingly larger share of the budget of the countries of the region (see Table II-20). If, in addition, we examine such indicators as repeating and attrition, we find that in many cases the expenditure is inefficient and that the rates of social return are low. Thus, studies on the rate of social return on higher education in various countries in Latin America show relatively low rates, even though the brain-drain—and in some cases the unemployment rate—has been ignored; this implies that these rates of social return on higher education have been overestimated.[16]

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[15] See, inter alia, Jallade and Kugler and Toledo, Chapters III and X of this book.

In higher education, overinvestment in some countries is explained by the fact that estimates of future demand are not made, and that, by giving a substantial subsidy to higher education, the government helps to make the rate of private return higher than the rate of social return and, consequently, stimulates a greater investment in that sector than it would have done if there were no subsidies. Nevertheless, since some professional personnel do not achieve a sufficiently attractive rate of private return, they leave their country, despite the very real obstacles to emigration, in order to obtain a higher return on the investment they have already made. To prevent the emigration of professional personnel, some Latin American countries have followed a policy of awarding high salaries to professionals in the public sector; thus, even though they moderate the problem in the medium term, they increase the demand for higher education and therefore make the problem worse in the long term.

This form of conceptualizing external efficiency, especially in the case of higher education, is more general and difficult to specify, since it is argued that public expenditure on education should be concentrated on preparing the manpower for which society has a more pressing need and that therefore it should be more profitable. This consideration takes on special importance in the countries of the region if we bear in mind the changes that are taking place in development strategy, the emphasis on social goals, in some cases, or on the less favorable external conditions they face in others, as well as the fact that frequently not all graduates, especially graduates of higher education, find appropriate employment and that professionals are often underemployed. Furthermore, the differences that exist between the marginal rates of return on the different levels, and the higher rates of growth of the less profitable levels, are interpreted as an example of the fact that the educational budget is not efficiently prepared. In this regard, theoretically, as and when the marginal rate of return on the investment in an educational level exceeds or is lower than alternative investments in other levels, society should, *ceteris paribus*, increase or reduce the resources allocated to that level.[17] This reallocation is valid whenever the investments under consideration are marginal enough not to affect the structure of relative wages. In addition, the differences between the rates are so great, and the lags so important, that they would permit changes over relatively long periods.

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[16] For example, in Colombia on the basis of uncorrected rates of return on higher education, and taking into account the emigration of professionals and the rates of return on primary and secondary education and on physical capital, it may be stated that there is overinvestment in higher education in relative terms.

[17] A complete and detailed analysis of this reallocation of resources should take into account, in the marginal rates of return specifically, such aspects as: influence of education on rural/urban migration, the rate of demographic expansion in different areas, the more complete development of natural resources, etc., that is, the external economies of education which, according to several authors (7) and (15), should be greater for primary education than for the other educational levels. In addition, because of the similarity of the external economies, comparisons of the different educational levels are open to fewer objections than comparisons of education with other sectors.

A study made by Dougherty and Psacharopoulos (7) shows that the reallocation of resources among different educational levels (see Table II-22) has very significant effects on the growth rate of the product.

Specifically, the results for Colombia, Chile, Mexico, and Venezuela—the only Latin American countries included in the study—show that it would be possible to increase the effect of educational expenditure on the growth of the product, at least temporarily,[18] by between about 22% for Mexico and 316% for Venezuela if the resources allocated to higher and secondary education were reallocated to primary education.

In addition, the reallocation of educational resources among different levels is justified not only on grounds of economic efficiency but also on grounds of income distribution, as stated earlier. By the same token, insofar as the unit costs of higher education are much higher than those of primary education, reallocation would allow the educational system to substantially increase its coverage of the number of persons served by it.

C. FINANCING EDUCATION

The previous section discussed the problems of efficiency of educational expenditure. The purpose of this part is to explore the conceptual alternatives open to the State as the body responsible for mobilizing and determining the resources intended for financing the educational process.[19]

Regardless of their ideological stance, most economists have agreed since the XIX century that Government should actively intervene to ensure greater expenditure on education, although this does not necessarily imply that Government should provide that service directly.

Both from the point of view of efficiency in the allocation of resources and from that of equity, the justification of this intervention is that it permits the entire population to have access to a service considered worthy and prevents greater concentration in the distribution of income.

According to the rules of the market economy, the free play of supply and demand should determine the optimum cost of a good or service. However, in the case of education there are at least two factors that indicate that expenditure on education might be less than the optimum. These factors are: the external economies that occur in educational expenditure and the lack of information available to some parents on the benefits of education for their children.

With respect to external economies, it is believed that, in addition to the benefits of expenditure on education that may be individually appropriated, there are social benefits additional to the private benefit of students from which no member of society can be excluded. For example, the attitudes and values transmitted through the educational system tend to promote a more integrated, stable and coherent society; nevertheless, the consumers of these benefits—all the members of society—know that, even if they did not pay individually for education, they would nevertheless obtain those benefits. Consequently, unless there is a tax that obliges them to contribute, citizens would act rationally if they chose not to do so.

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[18] That is, until the marginal rates of return are equal in the three educational levels.

[19] Unfortunately, this is a relatively unexplored field in the economics of education. Of the papers presented here, four of them mention the subject. However, it was deemed advisable to devote a few pages to the conceptual treatment of the subject. Therefore, there is little empirical evidence that supports the arguments offered here.

With respect to the second factor, some parents do not have sufficient information about the education they should provide their children with. It is believed that low-income families, who usually have little formal education, do not have as much interest in educating their children because they are unaware of the benefits derived from it. This is a common phenomenon in the region, as the ECIEL studies show (6, p. 258).

Furthermore, Government should provide access to education for the lower-income groups that are not in a position to pay for it and should ensure that the opportunities and benefits derived from education are distributed equitably in society. Thus, government intervention should aim at ensuring that at least the differences in the existing income distribution do not become more pronounced.

If the foregoing arguments are accepted, it is easy to justify the fact that Government has an obligation to provide greater education opportunities to the lower-income groups that so far have had limited access to elementary education.

This action is justified not only by the arguments outlined above, but also because it would be in line with the constitutional precepts of all the countries in Latin America,[20] which specify the right and duty of citizens to complete primary education.

In the regional framework, Government has at least three fundamental alternatives if it wishes to fulfill the function assigned to it in the educational field. These alternatives, which are explored in more detail in the following sections, are as follows: (a) to obtain more private financing of education in certain areas in such a way that it can reallocate the resources released to the fields it considers priorities; (b) to increase the internal efficiency of the educational system in such a way as to permit the release of resources that can be reallocated and thus expand the coverage of primary education and improve its quality; and (c) to increase the public resources channeled to the sector either by reducing public expenditure on other activities, increasing the public debt, revising the existing tax system, or using external resources.

1. Increased private participation in the financing of education

The private sector contributes to the financing of educational expenditures in several ways; on the one hand, it covers the costs of public education that are not financed by Government, for example, tuition, registration fees, uniforms, books, transportation and extracurricular courses; on the other hand, it bears the full cost of education when the coverage or quality of the services provided by Government are considered deficient.

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[20] See Table II-23, which shows the years of compulsory education for each one of the countries of the region.

In this regard it should be pointed out that, as individual and family income increases, the proportion of that income individual families are ready to spend on education increases. Studies made by ECIEL for eleven cities in the region show that the income elasticity of family expenditure on education ranges from 1.3 to 2.0 (12, p. 386) and that expenditure on education represents a small proportion of total expenditure at all income levels. In this investigation, with the exception of the Colombian cities studied and Caracas, the families in the highest 25% income bracket of the metropolitan centers of the region devote less than 3% of their total expenditure to education (see Table II-24). If the cities studied are taken together, it is found that the families in the highest 25% income bracket spend barely 3.5% of their total budget on education. These results suggest that a growing proportion of the increase in family income could be used to cover educational expenditures that have so far been financed by the public sector.

A larger private participation in the financing of education at all income levels cannot be expected, since lower-income families already make a considerable contribution through income forgone and tuition, books, and supplies they have to purchase for the education of their children. However, the higher-income groups do have a greater capacity to contribute to the financing of education, especially when these families receive a large subsidy from Government through higher education.

Thus, a widely discussed issue in these seminars has been the study of specific measures that could be adopted to ensure a greater participation of higher-income families in the financing of educational expenditures, in particular for higher education, in such a way that the contribution made by Government for the education of their children be reallocated primarily to expanding the coverage and improving the equality of education in favor of the poorer and lower middle income families.

One of the strongest arguments in favor of a larger share of educational expenditures at the higher level being paid by the individuals concerned and their families is that, whatever the external economies in education, a large part of its benefits are used or appropriated by the recipient through the increase in his income, whereas its cost is totally financed by society. This argument takes on even greater importance if the educational opportunities available at the higher level, in addition to being more expensive in terms of unit costs, favor the higher income groups. In addition, the fact that higher education is free artificially raises the rate of private return far above the social rate of return and produces an increase in the demand for higher education that exceeds by far the levels that economic efficiency make advisable, especially in those countries where the rate of emigration of professional personnel is high.

2. Financing of education through increases in public debt or change in the tax system

An important issue related to the decision to channel greater public resources to the educational sector is whether this decision is efficient from the point of view of economic growth. In this regard, it should be pointed out that, regardless of whether government resources come from higher-income persons, from proportional incomes across the entire population, or from regressive taxes, a larger public outlay on education must be efficient from the point of view of economic growth.[21]

If it were decided to increase the contribution to the financing of education by levying higher taxes to finance the expenditure rather then by increasing the public debt and/or reducing other government outlays, then at least the following tax principles should be borne in mind. The taxes should be neutral, that is to say, should not affect the allocation of resources in the private sector or, if they do so, they should do so in such a way as to help ensure a better allocation of resources. The taxes should be equitable, that is to say, they should be levied on those persons who are capable of paying them or who are going to receive the benefits of the expenditures financed out of the taxes. They should also be easy to administer and collect.

The reason for recapitulating the foregoing principles is that, when the advisability of increasing public expenditures on education in Latin America is studied, education economists and educators tend to recommend tax measures whose sole purpose is to make taxes equitable and to increase receipts and they forget such other principles as that taxes should be neutral and easy to administer. Thus, for example, in the seminar in Mexico, the advisability of levying a tax on professionals, which for many is neither neutral nor easy to administer, was discussed. This tax was also considered inequitable in that, when no charge is made for higher education, its sole purpose is to enable Government to recover at least part of the expenditures it has made on the education of professionals; however, such a tax discriminates against persons whose income is similar to that of professionals but do not contribute to a greater public revenue. What is more, to the extent that the income tax is progressive, professionals will pay more because of the higher incomes they derive from their better education.

Furthermore, as Rezende points out in his paper presented to the seminar in Mexico (see Chapter V of this book), the role of Government in the educational field should be seen as a whole. For example, if an additional tax that is not progressive is established, that is to say, a tax that is proportional or regressive, and if the expenditure financed with it is very progressive, the role of Government as a whole may still be progressive. To only look at the source of taxes and not at how the tax receipts are expended is likely to lead to erroneous conclusions.

Specifically, the author mentioned points out that the attempt to adjust the taxation system of the developing countries to the models prevailing in the industrialized countries may produce negative effects on financing capacity and the redistributive results of government action. This is so because a reduction in financing capacity limits the rate of expansion of social programs (including education programs) and denies the most underprivileged groups access to higher levels of schooling and income.

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[21] If it is considered that educational expenditures could be financed with a higher tax on high-income persons, it could be assumed, for example: (a) that these persons would save 30% of their income, (b) that all these savings would be channeled towards investments with a real rate of return of 10%, and (c) that a tax in the order of 2% of GDP would be levied. In this case, the rate of growth of GDP would decline 0.6% as a result of the reduction in investments in physical capital. However, if Government intervenes and collects these resources and channels 80% of them to education, then after the corresponding adjustments for the cost of collection and administration are made, the final effects of the exercise would be to increase the rate of growth of the countries by not less than 0.1% of GDP and possibly by as much as 0.2% of GDP. Consequently, it would be demonstrated that the argument that a greater tax-financed outlay on education could reduce the growth rate is incorrect.

In short, it should be borne in mind that the financing of education expenditures by means of additional taxes is really a problem for the tax specialist rather than for the educator or the education economist, although some of the suggestions made at the seminar about taxation arrangements may be useful to the tax specialist.

Another alternative for financing infrastructure and equipment expenditures in particular, would be external financing. In Latin America, external loans approved by international agencies like the IDB, World Bank group, and AID in 1962-77 amounted to 13% of the investment in the sector (see Table II-25). If we bear in mind that investments in education have usually been concentrated in the small countries, external financing may have been decisive in orienting education expenditure in the region, especially for each level.[22] From the strictly economic point of view, it appears advisable to use the external public debt for financing investments in education whenever its rate of return is greater than the total interest rate paid on external funds.

3. Expansion of the systems and the financing problem

For some authors, a distinguishing feature of our time is the change in the needs and aspirations of the population and the higher degree of social participation, which makes for a revolution in educational expectations. Thus, in many countries, organized groups are clearly exerting pressure for greater expenditure on education in competition with other alternative uses of these funds. Furthermore, at least in some countries, there is a desire to reduce the participation of Government in the economy, a position that makes for sharp conflict about the use of the limited public resources. As a result, in some sectors the fact that public expenditure on education may continue to increase at the same pace as in past years is being openly discussed.

There appears to be two positions. one is based on the assumption that the rate of growth of expenditure is becoming stabilized in most of the countries of the region and that, therefore, at the beginning of the 1980's, public expenditure on education as a share of the GNP will begin to decrease; the other holds that, while this expenditure is admittedly holding steady, the social pressure exerted by certain groups and the real increase in costs due to improvements in the quality of education will inevitably produce an increase in the financial requirements of the sector.[23]

In order to examine the second position in more detail, a special contribution[24] was requested in which the author develops a dynamic disequilibrium model that is non linear in the variables, which evaluates the financial needs of education in the region. According to this model, which is based on aggregate data for 1975, primary education does not have sufficient financial support or the resources are being used so inefficiently that very poor quality products are being produced, which weakens the basis of the system. Since the dynamics established is unstable, in view of the inefficiency of primary education, the system has reacted by assigning greater resources to secondary and higher education but without overcoming the earlier problems of the efficiency of the primary level; historically this has resulted in the generalization of inefficiency and underutilization of the resources allocated to the secondary and higher levels.

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[22] Aldo Solari in a recent article (19, pp. 66-70) argues that the concentration of World Bank and IDB financing on secondary education and higher education, respectively, has been responsible in part for the expansion of these educational levels being greater than that of primary education in recent years.

[23] Dagnino Pastore (5) and Munoz Izquierdo (Chapter IV of this book) are exponents of the first position. while the paper of Jallade (Chapter III of this book), among others, reflects the second position.

If these conditions persist, the likelihood is, on one hand, that the resources will be insufficient and will have to be reallocated to elementary education, especially in rural areas and shantytowns and, on the other, that the plan for financing secondary and higher education will have to be reorganized.

Therefore, in order to meet the financing requirements of the years ahead, the countries will have to evaluate their present educational policies with a view to optimizing the use of their resources.

D. CONCLUSIONS

In recent decades there has already been a marked expansion of the educational system in Latin America, for which purpose the governments have allocated more than 15% of their annual budgets to educational expenditures. However, as has been pointed out, serious problems of coverage, illiteracy, repeating, attrition, grade level retardation, and quality of the education provided still persist.

Furthermore, the financial efforts the governments have made are not reflected in the product of the system. Thus, the data analyzed point to problems of both internal and external efficiency at all levels, underutilization of resources, especially at the secondary and higher levels, and great neglect of the quality and coverage of the primary education provided in rural areas and urban shantytowns. ECIEL concludes that the youngest and the poorest do not have access to the support technology that can produce the difference between good and bad education.

In financial matters, there are various positions on the future requirements of the educational system. However, given the population growth rates, the social pressure for more and better education is likely to continue for a number of years; each government should therefore reevaluate its education finance policy and review its economic and social development strategy. In addition, it should at least:

(a) Examine the possibility of increasing the external efficiency of the system, especially at the higher level, with a view to its making a more effective contribution to economic and social development.

(b) Examine the possibility of increasing the participation of private resources, especially in higher education, and thus of releasing funds for primary education.

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[24] See the Annex to this book.

(c) Improve the internal efficiency of the system with a view to increasing productivity by level; this will make it possible to solve the problems of coverage and quality in rural areas and urban shantytowns, especially in elementary education, without the need for additional resources.

(d) Study the possibilities offered by the taxation system for generating increased resources for financing educational outlays.

(e) Consider the advisability of using external resources in projects whose rate of return justifies it.

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STATISTICAL APPENDIX

Table II-1. Latin America: Percentage of Illiterates 15 Years and Over, Selected Years

	Circa 1950	Percentage illiterates	Circa 1960	Percentage illiterates	Circa 1970	Percentage illiterates
Argentina	1947	13.6	1960	8.6	1970	7.4
Bahamas	1953	14.9	1963	10.3	1970	7.0
Barbados	1946	8.8	1960	1.8	1970	0.8
Bolivia	1950	67.9	—	—	1976	37.3
Brazil	1950	50.5	1960	39.4	1970	33.6
Chile	1952	19.7	1960	16.4	1970	11.0
Colombia	1951	37.7	1964	27.1	1973	19.1
Costa Rica	1950	20.6	1963	15.6	1973	11.6
Dominican Republic	1950	57.1	1960	35.5	1970	33.1
Ecuador	1950	44.2	1962	32.5	1974	25.8
El Salvador	1950	59.0	1961	51.0	1971	42.9
Guatemala	1950	70.6	1964	62.0	1973	53.8
Guyana	1946	24.0	1960	12.94	1970	8.6
Haiti	1950	89.3	—	—	1971	75.3
Honduras	1945	64.8	1961	52.7	1974	40.5
Jamaica	1943	25.6	1960	18.1	1970	4.6
Mexico	1950	42.5	1960	34.6	1970	25.8
Nicaragua	1950	61.6	1963	50.4	1971	42.1
Panama	1950	30.1	1960	23.3	1970	21.7
Paraguay	1950	34.2	1962	25.4	1972	19.8
Peru	—	—	1961	38.9	1972	27.2
Trinidad and Tobago	1946	26.1	1960	11.3	1970	8.3
Uruguay	—	—	1963	9.5	1975	10.2
Venezuela	1950	46.7	1961	34.8	1971	24.1

Source: UNESCO. Statistical Yearbook 1977, pp. 45–47; OAS. Américas en Cifras 1977, pp. 101–103.

Table II-2. Latin America: Percentage of Illiterates 15 Years and Over, Circa 1950, 1960 and 1970

	Number of Countries		
Percentage of illiterates	Circa 1950	Circa 1960	Circa 1970
Less than 10%	1	2	6
10–19.9	3	6	4
20–29.9	4	3	4
30–39.9	3	5	2
40–49.9	3	0	3
More than 50	6	4	1
	20	20	20

Source: Table II-1.
Only countries for which information for the three years was available are presented.

Table II-3. Latin America: Public Expenditure on Education as Percentage of Gross National Product and of Total Public Expenditures, 1960, 1965, 1970 and 1975.

	Public expenditure on education as % of gross national product				Public expenditure on education as % of total public expenditures			
	1960	1965	1970	1975	1960	1965	1970	1975
Argentina	1.9	2.9	1.9	2.7	—	23.4	14.4	18.8[c]
Bahamas	—	2.2	5.5	5.4[b]	—	14.8	23.2	22.9[b]
Barbados	2.9	—	6.2	7.0	—	—	21.2	21.2[b]
Bolivia	1.6	2.6	5.0	3.5	19.4	24.7	26.1	—
Brazil	2.0	2.4	2.8	3.7	10.5	11.9	10.8	21.1[c]
Chile	3.9	3.4	5.1	3.7	—	15.1	22.0	12.0
Colombia	1.8	2.3	3.3	3.3[b]	11.9	13.9	18.9	21.2[b]
Costa Rica	4.2	4.6	5.2	6.9	29.6	20.0	31.8	—
Dominican Republic	—	2.7[a]	2.9	—	—	14.5[a]	15.9	—
Ecuador	2.1	3.1	4.4	—	—	—	23.2	—
El Salvador	2.8	2.8	2.8	3.2	—	21.9	20.2	22.2
Guatemala	1.6	2.0	2.0	1.7[b]	16.2	22.3	19.5	16.7[b]
Guyana	3.0	4.4	4.7	8.0	12.1	14.0	16.0	15.2
Haiti	1.4	1.4	0.9	0.7[c]	—	16.7	11.8	11.2[c]
Honduras	2.1	2.9	3.2	3.4[c]	—	27.2	20.3	20.3[c]
Jamaica	2.5	3.3	3.9	6.0	16.4	16.4	—	16.0
Mexico	1.3	2.4	2.6	4.9	—	8.2	8.5	11.1
Nicaragua	1.5	1.8	2.1	2.3[b]	15.1	17.4	18.1	15.6[c]
Panama	3.5	4.1	5.4	5.8	23.6	27.2	24.8	23.9
Paraguay	1.3	1.9[a]	2.2	1.4[c]	—	—	15.3	17.2[c]
Peru	—	5.1	3.8	3.9	—	18.1	20.3	16.6
Trinidad and Tobago	2.8	3.4	3.9	4.3[b]	14.9	14.1	16.0	18.1[b]
Uruguay	—	3.7	3.6	—	—	—	26.1	—
Venezuela	2.7	4.0	4.8	5.4	11.7	18.0	22.9	—
Latin America (average)	2.4	3.0	3.7	4.1	16.7	18.4	19.7	17.9

Source: UNESCO. Statistical Yearbook, 1977, pp. 527–530.
[a] 1966; [b] 1973; [c] 1974; [d] 1976.

Table II-4. Latin America: Public Expenditure on Education, 1960, 1965, 1970 and 1975

As % of all public expenditure	Number of countries[a]		
	1965	1970	1975
Less than 10	1	1	0
10–14.9	5	3	3
15–19.9	4	5	6
20–24.9	3	5	6
25–29.9	2	1	0
	15	15	15

As % of GNP	Number of countries			
	1960	1965	1970	1975
Less than 2	8	3	2	3
2–2.9	6	9	6	2
3–3.9	3	2	4	6
4–4.9	1	4	2	2
5 or more	0	0	4	5
	18	18	18	18

Source: Table II-3.
[a] 1960 was not presented, since figures for all the 4 years were only available for 8 countries.

Table II-5. Latin America: Gross Enrollment Ratios, 1960, 1965, 1970 and 1975

	Primary				Secondary				Post-Secondary				Vocational * as % of secondary		
	1960	1965	1970	1975	1960	1965	1970	1975	1960	1965	1970	1975	1960	1970	Circa 1975
Argentina	98	101	106	108	32	28	37	55	10.87	14.45	14.23	28.10	50.0	59.0	63.0
Bahamas (*)	78	—	135	—	56	—	75	—	—	—	—	—	1.0	2.0	—
Barbados	95	106	100	101	39	61	65	77	0.77	2.77	3.87	6.91	5.0	7.0	7.0
Bolivia	64	73	68	79	12	18	21	31	3.60	4.59	8.74	10.13	14.0	11.0	10.0
Brazil	95	72	83	90[b]	11	17	27	18[b]	1.57	2.23	5.26	9.79[b]	19.0	17.0	47.0
Chile	109	124	107	119	24	34	39	48	4.16	5.89	9.40	16.5	26.0	33.0	34.0
Colombia	77	84	100	106	12	17	23	35	1.74	2.87	4.69	8.01	31.0	21.0	17.0
Costa Rica	96	106	110	109	21	24	28	42	4.80	6.04	10.28	17.13	19.0	10.0	12.0
Dominican Republic	98	87	101	110[b]	7	12	19	24[b]	1.31	2.19	6.53	9.39[b]	—	8.0	9.0
Ecuador	83	91	97	101	12	17	26	38	2.56	3.30	7.65	—	29.0	29.0	23.0
El Salvador	80	82	73	76[c]	11	15	22	21	1.08	1.73	3.30	7.69[a]	30.0	31.0	58.0
Guatemala	45	50	58	62(*)	7	8	11	13(*)	1.59	2.25	3.45	4.22	19.0	15.0	—
Guyana	107	111	98	94[a]	43	47	49	47[a]	—	0.70	1.94	3.40	14.0	5.0	5.0
Haiti	46	50	49	70(*)	4	5	6	8(*)	0.41	0.48	0.47	—	21.1	19.0	8.0
Honduras	67	80	93	89	8	10	12	13	1.04	1.46	2.15	4.88	24.0	18.0	—
Jamaica	82	97	85	98	43	51	50	58	1.67	3.35	5.39	6.97[b]	9.0	5.5	4.0
Mexico	80	92	104	112	11	17	22	35	2.62	3.86	6.07	9.83	24.0	24.0	—
Nicaragua	66	69	83	85[b]	7	13	18	21[a]	1.19	2.37	5.68	8.50	24.0	9.0	9.0
Panama	96	102	103	126[c]	29	34	40	53[c]	4.63	6.93	6.59	17.96	28.0	32.0	30.0
Paraguay	98	102	109	106[b]	11	13	17	20[b]	2.39	3.67	4.32	5.53[b]	7.0	6.0	5.0
Peru	83	99	107	112[c]	15	25	30	49[c]	4.09	8.07	10.79	14.41	20.0	17.0	23.0
Trinidad and Tobago	78	83	83	81[a]	22	34	36	36[a]	0.78	2.28	2.89	3.36[b]	1.0	6.0	8.7
Uruguay	111	106	106	95[b]	37	44	57	62[b]	7.88	8.25	9.90	11.09	23.0	21.0	19.0
Venezuela	100	94	94	100	21	27	37	44	4.29	6.76	11.70	18.96	24.0	40.0	5.0
Latin America	85	90	94	97	21	25	32	37	2.96	4.20	6.31	10.60	24.3	18.5	19.8

Source: UNESCO. Statistical Yearbook, 1977, pp. 144–154.
*World Bank. Social Indicators Data Sheet
[a] 1973; [b] 1974; [c] 1976.

Table II-6. Latin America: Age-Specific Enrollment Ratios, Selected Years (Percentages)

	Year	7	8	9	10	11	12
Argentina	1969	98	97	97	97	95	96
Bolivia	1970	68	80	81	82	68	55
Brazil	1970	64	73	78	79	67	56
Chile	1970	99	100	100	96	91	92
Colombia	1968	62	65	73	69	69	53
Dominican Republic	1969/70	67	75	78	83	85	75
Ecuador	1973	81	88	87	89	81	77
El Salvador	1971	58	66	71	70	74	60
Guatemala	1970	46	53	61	56	59	42
Mexico	1970	88	98	92	90	82	73
Paraguay	1974	83	86	90	86	85	86
Peru	1965	64	70	73	78	73	76
Venezuela	1970/71	84	88	88	92	82	79

Source: Schiefelbein, Ernesto. Requerimientos Financieros de Cambios en las Políticas de Educación Básica, p. 15.

Table II-7. Latin America: Illiteracy Rates in Rural Areas and Capital Cities in the 15–19 Age Group, 1970 (Percentages)

	Rural areas (A)	Capital City (B)	(A)/(B)
Bolivia	24.3	2.4	10.1
Chile	9.4	1.9	4.9
Costa Rica	6.4	1.6	4.0
Dominican Republic	30.9	8.5	3.6
El Salvador	40.5	3.8	10.7
Guatemala	57.9	9.5	6.1
Panama	20.5	1.6	12.8
Paraguay	11.8	3.1	3.8
Peru	26.6	1.9	14.0

Source: Filgueira, Carlos. Expansión educacional y estratificación social en América Latina.

Table II-8. Latin America: Students Enrolled in Primary Schools, 1960, 1965, 1970 and 1975
(Thousands)

					Annual growth rate		
	1960	1965	1970	1975	1960-65	1965-70	1970-75
Argentina	2,858.5	3,124.9	3,385.8	3,579.3	1.8	1.6	1.1
Bahamas	20.8	21.1	30.9	31.7	0.3	7.9	0.5
Barbados[b]	32.8	39.6	37.9	32.9	3.8	−0.9	−2.8
Bolivia[c]	390.2	495.3	679.1	879.8	4.9	6.5	5.3
Brazil[d]	7,458.0	9,923.2	12,812.0	20,402.2	5.9	5.2	9.8
Chile[e]	1,162.6	1,525.0	2,039.2	2,299.0	5.6	6.0	2.4
Colombia	1,690.4	2,274.0	3,286.1	3,953.2	6.1	7.6	3.8
Costa Rica	198.0	276.9	349.4	361.3	6.9	4.8	0.7
Dominican Republic	505.0	556.7	773.4	876.0	2.0	6.8	2.5
Ecuador[f]	596.0	800.5	1,016.5	1,228.6	6.1	4.9	3.9
El Salvador[g]	297.5	397.8	531.3	745.2[a]	6.0	6.0	7.0
Guatemala	299.8	383.8	505.7	621.3	5.1	5.7	4.2
Guyana	129.3	131.2	130.5	137.8[a]	0.3	−0.1	1.1
Haiti	238.9	283.8	327.4[a]	377.7[a]	3.5	2.9	2.9
Honduras	205.1	283.6	381.7	460.7	6.7	6.1	3.8
Jamaica[b]	247.9	323.8	376.1	370.2	5.4	3.0	−0.3
Mexico	4,885.0	6,916.2	9,248.2	11,461.4	7.2	6.0	4.4
Nicaragua	137.3	206.3	285.3	341.5	8.4	6.7	3.7
Panama	161.8	203.4	255.3	342.0	4.7	4.7	6.0
Paraguay[f]	301.7	357.0	424.2	452.2	3.4	3.5	1.3
Peru	1,406.4	1,900.6	2,341.1	2,848.3[a]	6.1	4.3	4.0
Trinidad and Tobago[b]	181.7	212.2	225.4	203.7[a]	3.2	1.2	−2.0
Uruguay	320.4	335.1	354.1	337.8	0.9	1.1	−0.9
Venezuela	1,223.0	1,453.3	1,769.7	2,108.4	3.5	4.0	3.6
Latin America and the Caribbean area	**24,950.1**	**32,425.3**	**41,566.3**	**54,452.2**	**5.4**	**5.1**	**4.8[h]**

Source: UNESCO. Statistical Yearbook 1970, pp. 182–188 and Statistical Yearbook, 1977, pp. 198–202.

OAS. América en Cifras 1977, Volume 3, pp. 118–121.

[a] Interpolated on the basis of the information available.

[b] Only public and subsidized schools.

[c] Beginning in 1969, the duration of primary education was increased from 6 to 8 years.

[d] Beginning in 1971, the duration of primary education was increased from 6 to 8 years.

[e] Beginning in 1967, the duration of primary education was increased from 6 to 8 years.

[f] Also includes night schools.

[g] Beginning in 197[illegible], the duration of primary education was increased from 6 to 8 years.

[h] The rate has been adjusted by assuming that the curricular reform in Brazil, which increased the duration of primary education from 6 to 8 years, did not take place and, consequently, the number of primary school students grew at an annual cumulative rate of 7.0% instead of 9.8%.

Table II-9. Latin America: Students Enrolled in Secondary Schools, 1960, 1965, 1970 and 1975
(Thousands)

	1960	1965	1970	1975	Annual growth rate 1960-65	1965-70	1970-75
Argentina	563.5	789.0	974.8	1,243.1	7.0	4.3	5.0
Bahamas	6.1	8.0	20.6	30.6	5.6	20.8	8.3
Barbados	14.7	15.4	20.5	29.0	0.9	5.9	7.2
Bolivia[b]	54.8	95.5	86.3	129.4	11.7	−2.0	8.4
Brazil[c]	1,177.4	2,154.4	4,086.1	1,637.8	12.8	13.7	−14.8
Chile	226.6	350.5	302.1	448.9	9.1	−2.9	8.2
Colombia	253.8	42[illegible].1	739.5	1,394.1	10.6	12.0	13.5
Costa Rica	27.5	4[illegible].1	61.1	111.5	7.8	8.8	12.8
Dominican Republic	53.1	56.7[a]	113.0	168.0[a]	1.3	14.8	8.3
Ecuador	69.1	117.4	219.4	380.1	11.2	13.3	11.7
El Salvador[d]	34.0	54.7	88.3	51.7	10.0	10.0	−10.2
Guatemala	27.3	49.0	75.5	129.0[a]	12.4	9.0	11.3
Guyana	23.9	47.0	60.4	73.5[a]	14.5	5.1	4.0
Haiti	19.4	24.5	31.3[a]	39.9[a]	4.8	5.0	5.0
Honduras	15.2	24.2	39.8	51.9	9.7	10.5	5.4
Jamaica	23.4	39.7	73.4	213.6	11.1	13.1	23.8
Mexico	200.2	1,002.6	1,584.3	2,939.0	38.0	9.6	13.2
Nicaragua	11.4	26.6	51.4	80.2	18.4	14.1	9.3
Panama	39.0	54.8	78.5	125.7	7.0	7.5	9.9
Paraguay	26.4	35.4	55.8	75.4	6.0	9.5	6.2
Peru	158.9	328.1	5[illegible]6.2	813.5	15.6	10.7	8.3
Trinidad and Tobago	21.3	46.1	[illegible]2.6	57.8[a]	16.7	2.7	1.9
Uruguay	93.1	122.7	174.3	187.0	5.7	7.3	1.4
Venezuela	183.1	267.2	465.9	669.1	7.9	11.8	7.9
Latin America and the Caribbean area	**3,323.2**	**6,169.7**	**10,001.1**	**11,279.8**	**13.2**	**10.1**	**6.5[e]**

Source: UNESCO. Statistical Yearbook 1970, pp. 248-261 and Statistical Yearbook 1977, pp. 268-282; OAS. América en Cifras 1977, Vol. III, pp. 133-141.

[a] Interpolated on the basis of available information.

[b] Beginning in 1969, the duration of secondary education was reduced from 6 to 4 years.

[c] Beginning in 1971, the duration of secondary education was reduced from 7 to 4 years.

[d] Beginning in 1971, the duration of secondary education was reduced from 6 to 4 years.

[e] This rate has been adjusted by assuming that the curricular reform in Brazil, which reduced the duration of secondary education from 7 to 4 years, did not take place and, consequently, the number of secondary school students increased at an annual cumulative rate of 1.0 instead of −14.8%.

Table II-10. Latin America: Students Enrolled in Post-Secondary Education, 1960, 1965, 1970 and 1975
(Thousands)

					Annual growth rate		
	1960	1965	1970	1975	1960–65	1965–70	1970–75
Argentina	173.9	246.7	274.6	596.7	7.2	2.2	16.8
Barbados	0.1	0.4	0.8	2.0[a]	32.0	14.9	20.5
Bolivia	12.0	16.9	35.3	49.9	7.1	15.9	7.2
Brazil	96.7	155.8	430.5	1,089.8	10.0	22.5	20.4
Chile	41.8	43.6	78.4	149.6	0.8	12.5	13.8
Colombia	23.0	44.4	85.6	186.6	14.1	14.0	16.9
Costa Rica	4.7	7.2	15.5	32.9	8.9	16.6	16.2
Dominican Republic	3.4	6.7	23.5	41.3	14.5	28.5	11.9
Ecuador	9.4	14.0	38.7	139.9[a]	8.3	22.6	29.3
El Salvador	2.4	4.1	9.5	28.3	11.3	18.3	24.4
Guatemala	5.2	8.4	15.6	22.9	10.0	13.2	8.0
Guyana	0.2	0.3	1.1	3.8[a]	8.4	29.7	27.9
Haiti	1.7	1.6	2.2[a]	2.9	−1.2	6.1	6.1
Honduras	1.7	2.6	5.0[a]	11.9	8.9	13.8	18.9
Jamaica	1.6	4.3	6.9	8.6	21.9	9.9	4.5
Mexico	77.0	133.4	247.6	520.2	11.6	13.2	16.0
Nicaragua	1.5	3.3	9.4	18.3	17.1	23.2	14.3
Panama	4.0	7.2	8.2	26.3	12.4	2.6	26.2
Paraguay	3.4	5.8	8.2	17.2	11.3	7.2	16.0
Peru	31.0	79.3	126.2	195.6	20.7	9.7	9.2
Trindad and Tobago	0.5	1.6	2.4	3.0	26.2	8.4	4.6
Uruguay	15.4	17.0	23.5[a]	32.6	2.0	6.7	6.7
Venezuela	26.5	45.3	100.8	213.5	11.8	16.8	16.2
Latin America and the Caribbean area	**537.1**	**858.9**	**1,549.5**	**3,393.8**	**9.8**	**12.7**	**17.0**

Source: UNESCO. Statistical Yearbook 1970, pp. 304-308 and Statistical Yearbook 1977, pp. 336–344; OAS. América en Cifras 1977, Vol. III, pp. 149–155.

[a] Interpolated on the base of available information.

Table II-11. Latin America: Educational Attainment of the Population 25 Years and Over, Selected Years

(Percentages)

			First Level		Entered Second Level		
	Year	No Schooling	Incompleted	Completed	C-1	C-2	Post Secondary
Argentina	1970	8.3	41.8	30.5	7.8	7.5	4.0
Barbados	1970	1.1	33.7	—	63.9	—	1.2
Brazil	1970	42.6	26.7	19.4	5.9	3.7	2.0
Chile	1970	12.4	57.2	—	26.6	—	3.8
Colombia[a]	1973	22.4	55.9	—	18.4	—	3.3
Costa Rica	1973	16.1	49.1	17.8	6.3	4.9	5.8
Dominican Republic	1970	40.1	41.6	4.3	9.6	2.5	1.9
Ecuador	1974	31.9	53.7	—	5.9	5.3	3.2
El Salvador	1971	54.7	38.3	—	6.1	—	0.9
Guatemala	1973	93.9	⟶		4.9	—	1.2
Haiti	1971	83.5	8.5	4.0	2.0	1.8	0.3
Honduras	1974	53.1	34.5	6.0	1.5	3.8	1.0
Jamaica	1960	18.8	75.3	—	5.5	—	0.5
Mexico[a]	1970	89.8	⟶		4.1	3.6	2.6
Nicaragua	1971	53.9	19.3	22.5	—	4.4	—
Panama	1970	24.9	53.5	—	9.0	8.4	4.2
Paraguay	1972	19.6	57.7	10.3	5.8	4.5	2.1
Peru	1972	35.0	47.1	—	13.4	—	4.5
Trinidad and Tobago	1970	11.6	74.6	—	12.6	—	1.2
Uruguay	1975	9.9	36.7	29.6	17.4	—	6.3
Venezuela	1961	49.1	28.4	15.7	3.1	2.2	1.5

Source: UNESCO. Statistical Yearbook 1977, pp. 54–58.
C-1: First cycle; C-2: Second cycle.
[a] Population 20 years and over.

Table II-12. Latin America: Percentage of Repeaters by Grade (First Level), Selected Years

Country	Year*	I	II	III	IV	V	VI	VII	VIII
Argentina	1970	23	13	11	9	6	4	1	—
Brazil	1970	28	16	12	8	15	12	10	6
Chile	1970	17	13	12	10	8	5	3	3
Colombia	1970	22	16	14	11	8	—	—	—
Costa Rica	1970	18	13	10	7	4	1	—	—
Dominican Republic	1970	33	21	18	13	10	6	—	—
Ecuador	1970	18	12	11	10	8	6	—	—
El Salvador	1969	24	18	16	13	12	7	—	—
Guatemala	1965	28	16	12	11	8	5	—	—
Guyana	1970	13	6	9	7	8	12	—	—
Mexico	1975	17	12	10	9	7	2	—	—
Nicaragua	1970	16	13	11	10	8	5	—	—
Panama	1970	24	17	16	12	10	3	—	—
Paraguay	1970	25	22	16	11	7	4	—	—
Peru	1970	26	19	14	13	11	6	—	—
Uruguay	1970	30	19	17	14	12	7	—	—
Venezuela	1965	24	12	14	14	11	5	—	—
Latin America (average)		**23**	**15**	**13**	**11**	**9**	**6**	**5**	**5**

Source: UNESCO. Statistical Yearbook 1977, pp. 244–245.
*The year nearest to 1970 available is presented.

Table II-13. Latin America: Retention Rate in Primary Education,[a] Selected Periods

	Period	Total	Urban	Rural
Argentina	1963–69	43.4	—	—
Brazil	1968–71	25.5	—	—
Chile	1965–72	35.7	—	—
Colombia	1967–71	31.3	—	—
Costa Rica	1966–71	54.5	—	—
Dominican Republic	1966–72	20.9	—	—
Ecuador	1964–69	32.1	58.3	16.8
El Salvador	1968–73	35.4	—	—
Mexico	1966–71	34.9	—	—
Nicaragua	1968–72	19.4	—	—
Panama	1966–71	54.3	81.1	46.0
Paraguay	1966–71	22.0	40.6	10.2
Trinidad and Tobago	1964–70	49.1	—	—
Uruguay	1967–72	57.6	71.8	36.1
Venezuela	1966–71	43.5	62.5	8.3
Latin America and the Caribbean area (average)	—	37.3	—	—

Source: OAS. América en Cifras 1974, pp. 85–90.

[a] Ratio of students that complete primary school to those that began it.

Table II-14. Latin America: Indicators of the Level of Economic and Educational Development

	Total population (millions)		Anual growth rate 1970–76 %	Urban population (%)		Anual growth rate urban population	GDP at 1973 prices (in millions of dollars)		Agricultural value added/GDP	
	1971	1976		1960	1976	1970–76 (%)	1971	1975	1970	1975
Argentina	23.6	25.4	1.5	73.6	83.2	2.3	31,214.3	35,689.4	13.7	12.1
Bahamas	—	—	—	—	—	—	—	—	—	—
Barbados	0.24	0.24	0.4	40.3	45.3	1.0	197.6	174.5	13.9	11.9
Bolivia	5.1	5.7	2.5	26.8	31.6	3.6	1,235.3	1,581.6	16.2	14.7
Brazil	96.0	110.1	2.8	46.1	62.7	4.8	58,736.6	82,339.2	16.0	14.0
Chile	9.5	10.4	1.8	67.8	81.6	3.1	10,860.2	9,481.8	9.0	10.1
Colombia	21.1	24.1	2.7	48.2	68.2	5.1	8,437.4	10,798.7	26.3	25.1
Costa Rica	1.8	2.0	2.8	32.7	43.6	4.9	1,216.6	1,544.5	22.5	19.9
Dominican Republic	4.2	4.7	3.0	30.1	47.9	6.0	2,052.4	2,920.0	24.7	17.8
Ecuador	6.0	6.9	2.9	34.9	42.6	4.2	1,926.7	2,881.0	28.3	21.4
El Salvador	3.6	4.1	3.5	38.4	40.2	3.8	1,460.9	1,778.7	26.2	25.4
Guatemala	5.2	5.9	2.8	33.6	31.2	2.2	2,920.6	3,636.7	27.3	27.6
Guyana	0.7	0.8	2.0	28.3	41.5	4.8	304.1	333.5	19.9	19.2
Haiti	4.3	4.6	1.7	15.[illegible]	22.4	3.9	591.1	688.3	48.9	42.2
Honduras	2.5	2.7	2.2	22.8	33.3	4.6	902.9	999.6	36.9	32.4
Jamaica	1.9	2.0	1.5	23.7	55.8	7.1	2,096.1	2,186.7	7.1	7.4
Mexico	52.4	60.1	3.5	50.7	61.7	5.0	36,661.7	46,711.4	11.6	9.6
Nicaragua	1.9	2.2	2.9	38.4	52.8	4.9	1,115.5	1,390.4	22.8	23.8
Panama	1.5	1.7	3.1	41.5	51.1	4.4	1,452.8	1,717.5	18.0	16.2
Paraguay	2.3	2.7	3.5	35.4	36.0	3.1	772.3	995.9	35.9	34.7
Peru	13.9	15.6	3.0	46.2	64.7	5.2	7,461.1	9,274.7	17.8	13.5
Trinidad and Tobago	1.0	1.1	1.3	39.2	58.3	4.4	1,085.9	1,296.5	5.0	4.5
Uruguay	2.7	2.8	0.7	80.8	80.8	0.7	2,584.7	2,651.7	16.4	15.1
Venezuela	10.6	12.0	3.1	66.7	74.7	4.0	14,526.4	17,823.7	7.0	6.7
Latin America	**266.4**	**303.3**	**2.8**	**48.3**	**52.3**	**4.3**	**189,818.2**	**238,895.9**	**14.9**	**13.4**

Table II-14. (Continued)

	Manufacturing value added/GDP		Commercial value added/GDP		% illiterates 15 and over	Public expenditure on education GNP 1973	Distribution of public current expenditure on education by level of education, 1970			Compulsory education	
	1971	1975	1971	1975	1970±		First	Second	Third	Age limits	Duration (years)
Argentina	36.9	37.6	18.1	17.5	7.4	3.0	30.4	30.3	21.0	6–14	7
Bahamas	—	—	—	—	10.3[a]	5.4	—	—	—	5–14	10
Barbados	11.5	13.3	24.2	26.3	1.8[b]	6.9[f]	34.7	34.9	—	5–14	10
Bolivia	13.8	14.6	12.4	12.7	61.2[b]	4.9	48.6	11.2	22.7	6–14	8
Brazil	22.6	23.8	17.3	17.9	33.8	2.9	45.5[c]	16.9[i]	23.6[i]	7–14	8
Chile	25.4	19.7	20.1	18.5	11.9	2.6	36.4[f]	14.5[f]	36.9[f]	6–15	8
Colombia	19.1	16.2	17.3	16.8	19.2	3.3	36.6	16.9	23.9	7–11	5
Costa Rica	18.6	20.0	21.0	19.7	11.6	5.7	51.2	18.9	10.5	6–14	9
Dominican Republic	17.3	17.3	18.1	17.9	32.8	2.6	41.1	21.0	20.7	7–14	7
Ecuador	17.9	17.4	15.2	21.7	32.5[c]	3.2[e]	45.9	41.0	9.9	6–14	6
El Salvador	18.7	18.6	23.0	22.9	42.9	3.6	57.9	11.8	21.4	6–18	9
Guatemala	16.0	15.1	28.6	28.1	53.9	1.7	58.0	16.9	13.1	7–12	6
Guyana	12.3	13.0	11.0	10.1	12.9[b]	6.3[g]	46.5	34.4	14.7	5–14	8
Haiti	9.9	11.2	10.4	10.0	76.7	0.7	—	—	—	6–12	6
Honduras	13.3	14.5	13.1	12.7	55.0[d]	3.0	64.2	15.4	12.2	6–13	6
Jamaica	17.4	17.2	19.5	18.7	18.1[b]	5.2	44.7	35.6	8.8	6–17	11
Mexico	27.0	27.9	34.4	33.6	25.8	3.1	50.9	27.2	10.4	6–14	6
Nicaragua	22.8	23.1	21.4	21.3	42.5	2.3	57.9	17.6	10.0	7–13	6
Panama	17.1	15.1	14.0	13.3	21.7	5.9	38.9	18.7	10.8	6–15	9
Paraguay	15.9	15.1	23.4	23.1	19.9	1.4[g]	64.8	17.1	16.5	7–14	6
Peru	24.6	25.7	14.5	15.8	27.6	4.3	41.4[e]	24.0[e]	15.7[e]	6–14	9
Trinidad and Tobago	7.7	8.0	9.8	7.3	7.8	4.3	52.5	25.9	12.1	6–12	7
Uruguay	22.8	24.5	14.3	14.3	—	3.6[h]	45.1	30.[illegible]	19.0	6–14	9
Venezuela	16.6	16.7	11.0	11.8	23.5	5.3	38.3	20.6	25.5	7–13	6
Latin America	**24.6**	**24.9**	**20.4**	**20.4**	**—**	**3.8**	**46.9**	**22.8**	**17.1**	**—**	**—**

Source: UNESCO. Statistical Yearbook 1977: IDB. Economic and Social Progress in Latin America.
[a] 1963; [b] 1960; [c] 1962; [d] 1961; [e] 1971; [f] 1972; [g] 1974; [h] 1970; and [i] 1973

Table II-15. Latin America: Education of the Labor Force and Income Distribution, Circa 1970

	Years of schooling of economically active population	% of economically active population with no schooling	Gini coefficient of concentration of income distribution
	(A)	(B)	(C)
Argentina	7.2	4.0	0.44
Brazil	3.1	36.0	0.66
Chile	5.8	8.2	0.48
Colombia	3.9	21.6	0.61
Costa Rica	4.8	10.8	0.49
Honduras	2.5	42.5	0.63
Mexico	3.5	27.[illegible]	0.59
Panama	5.2	17.1	0.57
Peru	4.5	19.3	0.60
Latin America (9 countries)	4.8	20.7	0.56

Source: ECLA. Economic and Social Development and External Economic Relations of Latin America, Vol. I, pp. 125 and 143.

$$(C) = 0.4533 + \underset{(0.0010)}{0.0053}\,(B) \qquad R^2 = .803$$

$$(C) = 0.7718 - \underset{(0.0089)}{0.0463}\,(A) \qquad R^2 = .794$$

Table II-16. Latin America: Inequality Indices (GINI), 1960–70

Country	Income distribution	Distribution of institutional expenditures			Distribution of years of schooling		
	Circa 1970	1960	1970	Difference 1960–1970	Difference 1960	1970	Difference 1960–1970
Guatemala	—	0.82	0.74	0.08	0.80	0.72	0.08
Brazil	0.66	0.76	—	—	0.63	—	—
El Salvador	—	0.76	0.72	0.04	0.73	0.64	0.09
Colombia	0.61	0.69	—	—	0.53	—	—
Dominican Republic	—	0.68	0.67	0.01	0.54	0.54	0.00
Mexico	0.59	0.67	0.68	−0.01	0.58	0.55	0.03
Paraguay	—	0.64	0.53	0.11	0.46	0.42	0.04
Peru	0.60	0.63	0.60	0.03	0.59	0.51	0.08
Chile	0.48	0.62	0.46	0.16	0.40	0.34	0.06
Panama	0.57	0.60	0.53	0.07	0.49	0.44	0.05
Ecuador	—	0.59	—	—	0.46	0.42	0.04
Argentina	0.44	0.53	0.53	0.00	0.37	0.34	0.03
Costa Rica	0.49	0.52	0.41	0.11	0.45	0.39	0.0[illegible]
Uruguay	—	0.49	—	—	0.38	—	—

Source: Filgueira, Carlos. Expansión y Estratificación Social en América Latina (1960–1970), p. 51: ECLA. Economic and Social Development and the External Economic Relations of Latin America, Vol. 1, p. 125.

Table II-17. Latin America: Rates of Social and Private Return by Educational Level and Country
(in percentages)

		Social			Private		
Country	Year	Primary	Secondary	Higher	Primary	Secondary	Higher
Mexico	1963	25.0	17.0	23.0	32.0	23.0	29.0
Venezuela	1957	82.0	17.0	23.0	—	18.0	27.0
Colombia	1966	40.0	24.0	3.0	50.0	32.0	15.5
Chile	1959	24.0	16.9	12.2			
Brazil	1962	10.7	17.2	14.5	11.3	21.4	38.1
Various countries		**25.1**	**13.5**	**11.3**	**23.7**	**18.3**	**17.8**

Source: Psacharopoulos, G. Returns to Education, pp. 62 and 65.

Table II-18. Sao Paulo and Pernambuco: Private and Social Rates of Return, 1969–70
(in percentages)

	Sao Paulo				Pernambuco			
	Primary education		Lower secondary education		Primary education		Lower secondary education	
Socio-economic characteristics	Private Rate	Social Rate	Private Rate	Social Rate	Private Rate	Social Rate	Private Rate	Social Rate
Total number off farms	15.1	14.3	12.7	11.0	19.0	18.2	15.7	15.1
Migrants from urban areas	13.8	13.2	12.4	11.7	19.6	18.8	15.5	15.1
Migrants from rural areas	12.9	12.4	11.4	10.8	17.1	16.7	12.1	11.5
Of low socio-economic level	14.9	13.8	9.8	9.2	18.9	17.5	13.1	12.4
Total Number on farms	12.8	11.4	11.0	10.0	8.0	7.2	n.d.	n.d.
Migrants from rural areas	12.9	11.8	10.2	9.1	6.7	6.2	n.d.	n.d.
Of low socio-economic level	9.1	7.0	6.6	5.4	10.0	9.0	n.d.	n.d.

Source: Jallade, J-P. Basic Education and Income Inequality in Brazil: The Long Term View, pp. 11 and 12.

Table II-19. Latin America: Expenditure per Student in Primary, Secondary and Higher Education, Selected Years[a]
(US$ dollars)

	Year	Primary (A)	Secondary (B)	Secondary C = B/A	Higher (D)	Higher E = D/A
Argentina	1974	124.4	273.7	(2.2)	522.5	(4.2)
Barbados	1970	90.8	1.307.5	(14.4)	—	—
Bolivia	1970	29.5	53.1	(1.8)	274.4	(9.3)
Chile	1969	48.4	145.2	(3.0)	1.524.6	(31.5)
Colombia	1973	16.3	26.1	(1.6)	122.3	(7.5)
Costa Rica	1970	68.9	151.6	(2.2)	323.8	(4.7)
Dominican Republic	1970	21.1	73.9	(3.5)	354.5	(16.8)
Ecuador	1970	24.8	104.2	(4.2)	143.8	(5.8)
El Salvador	1970	30.4	36.5	(1.2)	595.8	(19.6)
Guatemala	1970	38.5	77.0	(2.0)	258.0	(6.7)
Guyana	1970	34.0	54.4	(1.6)	1.261.4	(37.1)
Honduras	1970	34.5	82.8	(2.4)	410.6	(11.9)
Jamaica	197[illegible]	50.0	85.0	(1.7)	440	(8.8)
Mexico	1970	29.5	97.4	(3.3)	241.9	(8.2)
Nicaragua	1970	35.0	59.5	(1.7)	185.5	(5.3)
Panama	1971	78.9	134.1	(1.7)	394.5	(5.0)
Paraguay	1970	17.2	34.4	(2.0)	232.2	(13.5)
Peru	1971	44.4	84.4	(1.9)	319.7	(7.2)
Trinidad and Tobago	1970	61.9	123.8	(2.0)	1.361.8	(22.0)
Uruguay	1970	102.7	154.1	(1.5)	811.3	(7.9)
Venezuela	1970	104.4	219.2	(2.1)	1.252.8	(12.0)
Latin America[b]	—	—	—	**(2.8)**	—	**(12.3)**

Source: UNESCO. Statistical Yearbook 1976, pp. 587–589.

[a] The nearest year to 1970 for which information was available, is presented.

[b] Average.

Table II-20. Latin America: Percentage Distribution of Public Current Expenditure by Level of Education, 1965, 1970 and 1975

	Primary			Secondary			Higher			Other		
	1965	1970	1975	1965	1970	1975	1965	1970	1975	1965	1970	1975
Argentina	49.8	30.4	27.0	23.9	30.3	40.8	16.9	21.0	30.2	9.4	18.4	2.0
Barbados	—	34.7	27.3	—	33.9	29.7	—	13.0	18.6	—	19.3	24.4
Bolivia	56.4	48.6	64.4	16.3	11.2	13.4	17.9	22.7	5.2	9.4	17.6	17.1
Brazil	—	—	45.5[a]	—	—	16.9[e]	—	—	23.6[e]	—	—	14.0[e]
Chile	35.7	33.7[d]	34.9	17.9	14.9[c]	13.5	25.6	37.9[c]	25.2	20.8	13.4[c]	26.5
Colombia	39.6	36.6	44.2[e]	13.2	16.9	22.0[e]	24.5	23.9	10.5[e]	22.7	22.6	22.3[e]
Costa Rica	60.4	51.2	37.2	16.7	18.9	22.4	11.5	10.5	24.4	11.	19.4	16.1
Dominican Republic	44.8[a]	41.1	42.0[g]	15.6[a]	21.0	22.9[g]	25.4[a]	20.7	22.0[g]	14.2[a]	17.2	13.1[g]
Ecuador	41.3	45.9	—	21.1	41.0	—	32.3	9.9	—	5.3	3.1	—
El Salvador	66.6	57.9	—	9.5	11.8	—	11.6	21.4	—	12.3	8.9	—
Guatemala	56.3[b]	58.0	53.7[g]	16.2[b]	16.9	15.5[g]	12.3[b]	13.1	19.9[g]	15.2[b]	12.0	10.8[g]
Guyana	71.4	46.5	44.8	—	34.4	33.3	—	14.7	16.8	12.9	5.3	6.1
Honduras	71.1	64.2	—	15.2	15.4	—	10.3	12.2	—	3.4	8.2	—
Jamaica	49.4	44.7	35.7	27.9	35.6	32.3	9.9	8.8	19.8	12.8	10.8	12.3
Mexico	42.2	50.9	45.2	12.5	27.2	31.1	12.7	10.4	12.6	32.6	11.5	11.2
Nicaragua	60.9	57.9	—	17.3	17.6	—	7.1	10.0	—	14.7	14.4	—
Panama	51.6	38.9	39.1	23.5	16.7	23.5	8.9	10.8	12.6	16.0	31.6	24.6
Paraguay	68.6[a]	64.8	56.5	16.0[a]	17.1	15.1	15.0[a]	16.5	17.9	0.4[a]	1.7	10.5
Peru	41.8	41.4[c]	40.0[f]	18.1	24.0[c]	21.5[f]	13.5	15.7[c]	15.7[f]	26.6	18.9[d]	22.6[f]
Trinidad and Tobago	54.2	52.5	—	24.6	25.9	—	11.4	12.1	—	9.8	9.6	—
Uruguay	44.9	45.1	—	39.8	30.4	—	15.3	19.0	—	0.0	5.5	—
Venezuela	43.2	38.3	22.1	18.2	20.6	18.4	19.7	25.5	37.0	18.9	15.5	22.4
Latin America (average)	**52.6**	**46.8**	**41.2**	**18.8**	**23.0**	**23.3**	**15.9**	**16.7**	**19.5**	**13.5**	**13.6**	**16.0**

Source: UNESCO. Statistical Yearbook 1977, pp. 559–561.

[a]1966; [b]1967; [c]1969; [d]1971; [e]1973; [f]1974; [g]1976

Table II-21. Colombia: Percentage of Public Subsidies Received from Taxes Paid by Income Brackets, 1970

Income brackets (pesos per year) (1)	No. of households (2)	Totals (3) = (4) + (5) + (6) (3)	Primary education (4)	Secondary education (5)	Higher education (6)
0– 6000	19.0	117	108	9	0
6000– 12,000	20.2	83	77	4	2
12,000– 24,000	24.9	72	49	18	5
24,000– 60,000	22.9	55	22	20	14
60,000–120,000	8.8	23	4	7	12
120,000–240,000	3.4	10	1	3	6
More than 240,000	0.8	2	—	1	1
Total	100.0	33	16	9	8

Source: Jallade, J-P. Public Expenditures on Education and Income Distribution in Colombia, p. 40.

Table II-22. Latin America: Costs of Non-optimum Allocation of Educational Outlays Among the Three Educational Levels

	Contribution of educational expenditure to growth of the product		Costs of non-optimum allocation	
Country	Present allocation	Optimum allocation *	As % of GDP	As % of education budget
Colombia	.41	.57	1.6	112
Chile	.54	.70	1.6	55
Mexico	.43	.47	0.4	22
Venezuela	1.55	2.52	9.7	316

Source: Dougherty, C. and G. Psacharopoulos. Measuring the Cost of Misallocation of Investment in Education. In The Journal of Human Resources, Vol. XII, No. 4, p. 454.

*Effects until the marginal rates of return on the three levels became equal.

Table II-23. Latin America: Years of Compulsory Education

	Compulsory education	
	Age limits	Duration (years)
Argentina	6-14	7
Bahamas	5-14	10
Barbados	5-14	10
Bolivia	6-14	8
Brazil	7-14	8
Chile	6-15	8
Colombia	7-11	5
Costa Rica	6-14	9
Dominican Republic	7-14	7
Ecuador	6-14	6
El Salvador	6-18	9
Guatemala	7-12	6
Guyana	5-14	8
Haiti	6-12	6
Honduras	6-13	6
Jamaica	6-17	11
Mexico	6-14	6
Nicaragua	7-13	6
Panama	6-15	9
Paraguay	7-14	6
Peru	6-14	9
Trinidad and Tobago	6-12	7
Uruguay	6-14	9
Venezuela	7-13	6

Source: UNESCO. Statistical Yearbook 1976, pp. 130–134.

Table II-24. Latin America: Education Expenditure as Proportion of Total Expenditure by Income Quartiles in Eleven Cities

	Quartile			
	I lowest	II	III	IV highest
Barranquilla	2.23	3.29	3.31	5.55
Bogota	2.36	5.45	4.70	6.14
Cali	1.34	2.36	3.16	3.90
Medellin	1.92	2.95	4.02	4.85
Santiago	0.28	0.52	0.71	1.41
Quito	0.66	1.55	2.34	2.42
Guayaquil	0.61	1.52	1.62	2.06
Asuncion	1.37	2.24	1.84	2.21
Lima	1.11	1.68	1.57	2.45
Caracas	1.50	2.94	3.77	4.89
Maracaibo	0.85	0.95	1.59	2.73
Average:	**1.29**	**2.31**	**2.66**	**3.51**

Source: Musgrove, P. La Contribución Familiar al Financiamiento de la Educación en América Latina. In Brodersohn, Mario and Maria Ester Sanjurjo, Financiamiento de la Educación en América Latina, pp. 350–360.

Table II-25. Latin America: Education Loans of International Lending Agencies as Percentage of Total Investment in Education, 1962-77
(Millions of dollars)

Year	Education loans at current prices: IDB (A)	IBRD (B)	IFA (C)	AID (D)	Total (A + B + C + D = E)	Education loans at 1976 prices (F)	Estimated public investment in education at 1976 prices (G)*	Education loans as % of investment in education (F ÷ G)
1962	12.1			0.6	12.7	24.5	379.5	6.46
1963	4.1			3.1	7.2	13.9	406.9	3.42
1964	13.1			2.4	15.5	29.9	451.6	6.62
1965	7.2	2.8		12.0	22.0	41.7	509.4	8.19
1966	29.1	9.5		1.5	40.1	73.5	549.5	13.38
1967	35.6			18.8	54.7	99.7	591.8	16.85
1968	9.4	27.3	5.1	58.8	100.6	178.7	651.7	27.42
1969	26.4	7.8	2.9	19.5	56.6	97.3	719.3	13.53
1970	13.2	15.0		81.9	110.1	182.4	836.7	21.80
1971	67.3	21.9	4.0	22.0	105.2	168.2	919.7	18.29
1972	28.7	9.3	5.1	13.2	56.3	88.4	1,008.6	8.76
1973	96.1	51.4		47.6	195.1	282.3	1,121.6	25.16
1974	19.0	43.5	3.0	20.3	85.8	101.4	1,204.0	8.42
1975	70.8	20.0	4.0	32.4	127.3	133.2	1,272.1	10.47
1976	79.4	37.5	9.5		126.4	126.4	1,364.1	9.27
1977	84.7	47.0		19.8	151.5	142.7	1,459.3	9.77

Source: IDB. Financiamiento Externo de los Países de América Latina, Cuadros No. 51-54.
*Public investment in education was estimated to be 10% of public expenditure on education.

CHAPTER III

Education and Economic and Social Development in Latin America

Jean-Pierre Jallade[1]

INTRODUCTION

The objective of this paper is to reflect on the role of education in the economic and social development of Latin America and to assess the implications of various educational policies for the allocation of resources to and within the education sector. Clearly, the range and complexity of the issues that should be viewed in the context of this subject are such that a paper of this kind has to be selective. Systematic preference was given to a survey of the main trends that, in the long term, may exert a decisive influence on the type of educational development adopted in the region. The level of analysis is Latin America as a whole, but reference to homogenous groups of countries is made whenever necessary to illustrate the analysis. Thus, the paper is not intended to be a policy recipe for each individual country, rather it provides a framework for "situating" each country in relation to the average for the region as a whole.

The main focus of the paper is past and future education strategies and their relations with economic and social development. The paper is intended to be a policy-oriented, issue paper that can be used as a basis for discussions by the participants of the seminar. It is mainly concerned with the determination of educational priorities in the light of what has already been achieved and what remains to be done. The presentation of figures is restricted to the minimum required to support the argument, since more detailed and systematic statistical information is available in other papers prepared for the seminar. Both formal and non-formal education are considered, but no detailed study of the various education levels has been included here since they are dealt with at length in other papers.

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Before we think about the future, it is important that we learn from the past. Section A of the paper will therefore attempt to draw the lessons to be learned from past educational development. Section B will review the main issues at present faced by education systems in Latin America under the following headings: quantitative growth of education systems and distribution of educational opportunities; internal efficiency and quality of education. Section C will examine the relations between education and development, here referred to as external efficiency. Finally, Section D will briefly explore the main implications of various education policies in terms of costs and financing.

A. LESSONS OF THE PAST

1. Formal education

During the last twenty years, education in Latin American countries has undergone an unprecedented expansion. To a large extent, this quantitative expansion has been financed out of public funds. These facts are not disputed. What happened to public expenditures on education during this period is one of the most visible signs of progress (see Table III-1).

In 1975, only six Latin American countries devoted less than 15% of their public budgets to education compared with ten in 1960. Eight are now spending over 20% as against five in 1960. In 1975, the proportion of GNP devoted to education was less than 2% in two countries compared with seven in 1960. Five countries are now spending more than 4% of GNP on education as against only one in 1960.

Thus, public expenditures on education have, in general, increased faster than public budgets or GNP. In other words, education was accorded priority during this period, compared with the other sectors competing for public funds.

What has been achieved with all this money? The answer is enrollment growth, and a very substantial one at that. According to UNESCO statistics 57.2 million children were enrolled in primary education in 1975 as against 27.6 million in 1960, which means an average rate of increase of 5% annually (see Table III-2). Secondary school enrollment rose from 3.2 to 12.2 million (average rate of increase, 9.3% annually). As for the number of university students, it went up from 0.6 to 3.5 million, which represents an average rate of increase of 12.7% a year.

In the aggregate, these achievements are impressive but, behind the global figures, there is a reason for concern. When recent trends in enrollments are examined in more detail, two observations may be made:

(i) enrollments in higher education increased at a consistently higher rate than enrollments in secondary education, which, in turn, increased faster than enrollments in primary education.

(ii) while secondary and higher education succeeded in maintaining their growth momentum during 1960–75 (higher education even accelerated), the growth rate in primary education has been steadily decreasing and is expected to drop to 3.5% annually between 1975 and 1980.

In other words, recent educational expansion in Latin America has largely favored the upper levels of education at the expense of primary education. Moreover, as Section B will show, it has done so in spite of the fact that universal primary education—that is to say, full coverage of the relevant age group—is still far away for most countries. To the extent that primary education is still "the education of the poor" while the beneficiaries of secondary and higher education tend to come mostly from the middle and upper classes, this type of educational growth tends to reinforce the "elitist" aspect of education systems at the expense of the participation of the poorest segments of society.

This expansion—it is recalled—was financed mostly out of public funds. Today in Latin America, public expenditure per student in higher education is roughly eleven times what it is in primary education and, in secondary education, twice as much as in primary education (see Table III-3). In this respect Latin America occupies an intermediary position between the OECD countries, where differences in expenditure per student between levels are small, and Africa, where they are very large.

Still, from the strict viewpoint of resource allocation, these differences mean that one university student is roughly equivalent to 11 children in primary education. And from the standpoint of distribution, they mean that a substantial proportion of the public funds used to finance educational growth benefit middle and upper income groups.

This pattern of unit costs, coupled with relative increases in enrollment in the various levels mentioned above, has had an extremely important impact on the allocation of resources to levels of education within the education sector. Past trends reflect the priority assigned to the higher levels of education at the expense of the primary education (see Table III-4). In 13 out of 20 Latin American countries, the share of higher education in the education budget increased in the past ten years. In 12 countries the share of primary education consequently decreased, even though primary education is far from being universal in the region.

If the priority assigned to primary education in the Latin American countries is compared with that in the OECD countries, the result is striking. In the OECD area, where universal primary education has been the rule for some time (except in a few Mediterranean countries), the share of the education budget assigned to primary education is decreasing in only eight out of 20 countries and the share of higher education is increasing in only five out of 20 countries. In other words, the policy option of the OECD countries has been to reinforce the *base* of the educational pyramid—both quantitatively and qualitatively—since the resources that continue to be assigned to primary education are no longer used to finance quantitative growth[2] but rather to improve quality—and to invest slowly in the apex of the educational pyramid. In contrast, the Latin American countries have expanded the middle and the apex on a small base.

2. Non-formal education

a. *The literacy situation*

Over the past twenty years, illiteracy rates have decreased slowly and regularly in all Latin American countries but, in seven countries out of 20,[3] progress has not been sufficient to prevent the absolute number of illiterates from growing. And in seven other countries[4] the number of illiterates has not significantly diminished over the past ten or twenty years. There is a large variety of situations as regards the timing and persistence of the effort to reduce illiteracy. Some countries with a very bad initial situation—such as Mexico—have made significant and sustained progress during two decades. Other countries—Peru for instance—started later and made their most significant achievements during the sixties. Brazil did not begin mass literacy campaigns until later in the seventies. Some early starters—such as Costa Rica or Argentina—now seem to have reached a ceiling and are apparently unable to wipe out the remaining pockets of illiteracy.

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[2] Primary education enrollments are stable in most of the OECD countries.

[3] Bolivia (1950-60), Brazil, Costa Rica, Dominican Republic, El Salvador, Haiti, Panama.

At the beginning of the seventies, illiteracy was still a widespread phenomenon throughout Latin America. According to UNESCO statistics, there were about 42 million illiterates in the region, that is, about 28% of the total population aged 15 years and over. Illiterates account for less than 20% of the adult population in only seven countries (see Table III-5). Illiteracy is, as usual, more widespread in rural areas than in urban areas, and among women than men. About 40% of rural females aged 15 years and over, that is, about 18 million women, are illiterates. Indigenous populations are, on the whole, less literate than Spanish or Portuguese-speaking populations.

There is still much to be done on the literacy front. In the past, literacy campaigns often lacked an adequate institutional framework, financial resources and, even more important, a persistent commitment on the part of governments. They were not always well suited to the characteristics of marginal groups speaking indigenous languages in rural areas. Above all, the special needs of the 18 million adult women living in rural areas of Latin America have still to be met through adult education schemes appropriately designed for them.

In most Latin American countries, illiteracy rates increase—sometimes sharply—with age, which reflects the tendency of many educational policy-makers to rely mostly on the extension of formal primary education and literacy campaigns aimed at young adults to solve the literacy problem. This course of action may be disappointng for two reasons: first, in many countries primary education is still far from covering all the 6–11 age-group, as will be seen later; as a result the ranks of the adult illiterates are constantly swollen by cohorts of illiterate youngsters who missed school. Second, it will take years for the younger generations to replace older ones. Not only is this policy untenable from the viewpoint of social justice but it may result in a loss of valuable human capital in a region that has undertaken a vigorous process of industrialization. In any case, all the efforts made so far to institutionalize and fund adult education do not fare favorably when compared with the huge amounts of money and official attention devoted to formal education.

b. Vocational training

Vocational preparation and apprenticeship outside the formal school system began to develop rapidly in the early sixties when countries like Argentina, Brazil, Colombia, Ecuador, Guatemala, Honduras, Paraguay, Peru and Venezuela adopted the principle of financing vocational training through a tax on the wages paid by private and sometimes public firms. In most cases, institutional responsibility for vocational training was vested in the ministry of labor or a semi-public body, although, in some cases like Argentina and Venezuela, it remained with the ministry of education.

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[4] Argentina, Ecuador (1950–60), Guatemala, Honduras, Mexico, Nicaragua, Paraguay.

No systematic statistical information on trends in vocational training is easily available in Latin America. In 1974, the number of trainees enrolled in vocational training schemes with public sponsorship was estimated at about 2 million persons. This is still a small figure when compared with the 12 million students enrolled in the secondary schools of the region. About 1 million vocational training graduates are turned out every year, that is, about 1% of the total active population of the region. Some countries have emphasized industrial training in order to boost their industrialization efforts, and the annual number of graduates from industrial training schemes represents a higher proportion of their industrial labor force: 6.6% in Colombia, 3.8% in Brazil, 2% in Peru and 1.8% in Chile.[5]

Expenditure per trainee varies considerably between countries: it is on the low side—less than US$1 per student/hour—in Brazil, Chile, Colombia and Costa Rica; it is very high—between US$4 and 5 per student/hour—in Honduras, Mexico and Peru. Many vocational training systems spend what seems to be a very high proportion of their budget (around 50%) on administration.

In short, vocational training has made significant headway during the past twenty years although it is still far less developed than formal education. It has benefited from a steady flow of resources thanks to its nonbudgetary system of finance. Enrollments are, however, often restricted to an urban elite in the industrial and service sectors and, in some cases, very lavish training is provided. So far, vocational training systems are reaching only a small proportion of the urban labor force.

Vocational training for rural occupations does not seem to have received the same priority. To be sure, there are extension services in nearly all the countries in the region and farmer training schemes have been launched to support localized rural development operations. But no significant breakthrough in systems of financing—comparable to the payroll tax for industrial training—that reflects government commitment to change, can be observed. Extension services often lack a clear definition of their objectives: Should they support export-oriented crops or local consumption crops? Should extension agents be specialists in one field or multi-purpose agents? Should they restrict their functions to the teaching of new methods or should they be used to provide farmers with other development services? How should extension be related to the supply of complementary inputs such as credit, fertilizers, and the like?

In addition to the lack of well-defined priorities, the effectiveness of extension services is jeopardized by their limited means. All too often the broadening of their coverage is subordinated to the financial ability of the ministry of agriculture to hire new extension workers. And this is seldom a top priority. The quality of the services depends on a series of factors, such as the availability of in-service training, for informing extension workers about new cultural practices, proper coordination with the supply of complementary inputs (over which extension services usually have little control), the presence of farmers organizations able to select "contact" farmers, not to mention more commonplace—but nonetheless important—factors such as adequate transportation for extension agents, pay and career prospects commensurate with the difficulties of the job, etc.

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[5] See Castro, Claudio de Moura. Financiamiento de la educación tecnica y vocacional en América Latina. In Brodersohn, M and Maria Ester Sanjurjo (ed.). *Financiamiento de la Educación en America Latina.* Mexico, Fondo de Cultura Económica, 1978. pp. 467-517.

All these factors may account for the lack of spectacular developments in the area of extension services. But, to a large extent, these difficulties in defining clear objectives and in providing appropriate means of attaining those objectives reflect more profound difficulties in reaching a policy consensus about the role of the agricultural sector in Latin American economies.

The conclusions of this sketchy survey of past trends can be summarized as follows:

(i) The rapid enrollment growth recorded in the region chiefly benefited higher and secondary education. Enrollment growth in the primary education was slower. Moreover, it was steadily slackening during this period.

(ii) Because of the differences in public outlays per student among the different levels of education and the relative increases in enrollment, the share of the education budget assigned to primary education decreased in most of the Latin American countries even though the proportion of out-of-school children at this level is still high.

(iii) Illiteracy was not eradicated, far from it. Literacy campaigns seldom received sufficient political support to be able to achieve appropriate institutionalization and steady financing.[6]

(iv) On the contrary, out-of-school vocational preparation was institutionalized in the early sixties in many countries of the region and funds were available. The implicit policy choices governing the development of vocational training seem to have been a) priority to training for urban—and, in some cases, industrial—occupations and b) high-cost training for a few rather than low-cost training for a significant proportion of the labor force.

(v) On the whole, vocational training for rural occupations was given a low priority.

B. UNRESOLVED ISSUES IN LATIN AMERICAN EDUCATION

The main issues faced by education systems in Latin America have been classified into two broad categories, namely (i) quantitative growth and distribution of educational opportunities; (ii) internal efficiency and quality.

1. Quantitative growth and distribution of educational opportunities

In depicting past educational expansion, the preceding section has shown that primary education was relatively neglected compared with the upper levels of the education system. This is clearly an issue to the extent that most countries are committed, sometimes legally, to providing compulsory basic education to all children. Casual observation of gross enrollment ratios may lead one to believe that this objective has been nearly met in Latin America. The region as a whole had a gross enrollment ratio of 110% in 1975, and only five countries (Guatemala,

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[6] MOBRAL in Brazil has now become an important exception.

Haiti, Colombia, Nicaragua and Honduras) have gross enrollment ratios of less than 90% (see Table III-6). However, closer observation reveals that much remains to be done if universal primary education is to be achieved since nearly one child aged 6-11 out of four (23.2%) is still out of school. The proportion of out-of-school children is one out of three or more in seven countries out of twenty (see Table III-6).

This apparent contradiction between gross enrollment ratios and out-of-school ratios is simply due to the fact that the former ratios consider total enrollment at a given level—including over-aged students—as a proportion of the relevant age group. This explains why gross enrollment ratios can be higher than 100 and how such ratios can coexist with high out-of-school ratios. They are artificially boosted by large numbers of over-aged students who take the places of students in the 6-11 age group. As such, they should be considered a measure of the inefficiency of the system, that is to say of its inability to properly process students through each educational cycle, rather than as a measure of achievement.

If the policy objective is to enroll all the relevant age groups in primary education, the proportion of the age group that is out of school is the only reliable indicator of what remains to be done in this area. And there is still a lot to be done in most countries. At the present annual rate of growth of 3.5% in primary education enrollments, it will take many years to accommodate the next generations of children in the 6-11 age group—which are expected to increase 2.5% a year—and to absorb the backlog of unenrolled children.

The inability of education systems to enroll all the 6-11 age group in primary education has profound and negative consequences for the distribution of educational opportunities, since those who are harmed most by this situation are usually the poorest segments of society. The evidence available in Brazil on out-of-school population, broken down by socio-economic groups, illustrates the point (see Table III-7). This table shows that:

i. the out-of-school population is unequally distributed among socio-economic groups;

ii. the disparities in educational opportunities between urban and rural populations are enormous. For instance, only 13% of urban males aged 10 are out of school as against 44% for rural males of the same age;

iii. the disparities between sexes are small;

iv. children with low socio-economic backgrounds are more likely to be out of school than children with higher-income backgrounds; the disparities are not as large as among rural and urban populations but they are nevertheless substantial: between 10 and 15 percentage points;

v. universal primary education is in sight for only a few socio-economic groups, namely urban males and females, aged 8 to 10, in the state of Sao Paulo where out-of-school ratios are less than 10%;

vi. comparisons of out-of-school ratios between socio-economic groups in an advanced state (Sao Paulo) and a backward state (Pernambuco) show substantial disparities in educational opportunities. In the age group 7-11 years, poor regions have substantially higher out-of-school ratios than advanced regions and the disparities among rural populations are more than twice as big as among urban populations;

vii. there are two important exceptions, however: out-of-school ratios for groups with a *low* socio-economic background at age 7 to 10 are as high in advanced regions as in poor regions. Second, at age 12-14 out-of-school ratios in advanced regions are systematically higher than in poor regions, which probably reflects the higher opportunity cost of primary schooling in the former than in the latter. And the differences are generally higher in urban areas than in rural areas, probably for the same reason.

These findings describe the Brazilian situation, but broadly similar conclusions would emerge in all Latin American countries if systematic studies of the school situation of young children were to be made. Of course, the size of disparities in educational opportunities at the primary level would probably vary across countries, but the urban/rural gap as well as the disparities among populations of different socio-economic backgrounds would still be there. On the other hand, disparities between sexes are no longer a problem.

Thus, it is by now clear that the type of educational expansion adopted in the region has helped to perpetuate disparities in one of the fundamental educational opportunities—namely, access to primary education—by putting the emphasis on the upper levels of education systems instead of completing the job at the primary level. Under the present budgetary constraints, a policy aimed at providing universal primary education to all may well require a change in the present priorities that have long favored secondary and higher education. To the extent that this policy would primarily benefit the poorest segments of society, it would help distribute educational opportunities more equally across socio-economic groups.

So far, the analysis has been deliberately restricted to one type of disparity, namely disparity of access to primary education because it has to be solved first before other types of disparities—for instance, in educational attainment, access to secondary education, etc.—can be considered. In the following section, the issue of the quality of education at the primary level will be briefly surveyed.

2. Internal efficiency and quality of education

One of the main objectives of primary education is to make children literate. To attain this goal, it is not enough to give them access to school. It is also necessary (i) to keep them in school for a sufficient number of years and (ii) to provide them with good quality education. The extent to which the region has met these two conditions is examined below.

a. Internal efficiency

The internal efficiency of educational systems consists in their ability to keep children at school and process them without delay or wastage throughout each level of education. In Latin America today, primary education is still plagued by large numbers of repeaters and dropouts. In six countries out of the 17 for which data are available, the proportion of repeaters in the total student population is over 15% of total enrollment. Furthermore, it is highly plausible that Honduras, Bolivia and Haiti—for which no data on repeaters are available—also fall into this category (see Table III-8).

In many countries, children do not repeat much because they drop out. Using both repeater and dropout rates, it is possible to compute the input/output ratio, which can be considered an overall measure of efficiency.

This ratio is defined by the total number of student years required by a cohort or 1,000 to complete the primary cycle, divided successively by the number of students reaching the last grade and by the legal number of years in the cycle. An input/output ratio equal to one indicates perfect efficiency and the higher the ratio, the lower is efficiency. In seven out of 17 countries, input/output ratios are close to or higher than 2, which means that two student-years are required to produce one successful student-year. With the exception of Guyana with a ratio of 1.1, the educationally most advanced countries seem unable to go below 1.3-1.4. In other words, about one third of the student years provided in primary education are "wasted" either because they are repeater years or because students drop out before reaching the last grade. In the words of a recent UNESCO report, "the problem of dropouts and repeaters has lost none of its gravity in Latin America".

This low internal efficiency of the educational system means low retention rates throughout primary education. These rates, which depict the progression of children through each grade, are shown in Table III-9. If completion of grade 4 is used as an indication of the level of education required to become and remain literate,[7] then less than half of the children attain this level in ten countries.[8]

On the whole, retention rates vary according to levels of economic development. As expected, Argentina, Chile, Uruguay and Venezuela fare better than the average of the region. On the other hand, the excellent record of Guyana shows that efficiency in primary education does not necessarily require very high levels of GNP per capita. Needless to say, survival rates computed within each country—for different socio-economic groups and for urban and rural areas—point to very low rates for underprivileged groups.

When compared with other regions of the world, including regions far less advanced in terms of economic development, Latin America does not fare well. On the whole, survival rates tend to be higher in Asia than in Latin America. The inability of Latin American educational systems to keep children at school long enough casts doubt on their contribution to the reduction of illiteracy. Clearly, when half of the children drop out before becoming literate, new cohorts of illiterate youngsters will go to swell the ranks of illiterate adults. This situation, combined with weaknesses in adult literacy programs, is responsible for the persistence of illiteracy in Latin America.

b. Quality of education

What do children learn during these few years at school? This is still an area of considerable uncertainty. So far, few studies assessing the scholastic achievement of primary school children in Latin America are available. The IEA[9] studies designed to compare scholastic achievement across countries were devoted primarily to industrialized countries. Chile, which was the only Latin American country included in the study, did not fare too well.

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[7] And this is considered an absolute minimum by educators.

[8] The full set of data necessary to compute survival rates is not available for Honduras, Bolivia and Haiti. Partial information indicates that these rates lie somewhere between those of El Salvador and the Dominican Republic.

[9] International Association for the Evaluation of Educational Achievement. This Association is based in Stockholm.

In the absence of hard evidence on the achievement of primary school children, the mix of inputs that are expected to have an impact on the quality of learning may be examined. Teachers, for instance, are certainly an important ingredient of the learning process. But their qualifications vary greatly from country to country and, within each country, between urban and rural areas. The 1968 Educational Census taken in Colombia reports five categories of teachers, broken down by levels of qualification. Close to 73% of the least qualified category (primary education completed) teach in rural areas and 89% of the most qualified category teach in urban areas. Very often, the least qualified teachers are put in the most difficult pedagogical situations such as, for instance, multi-grade teaching. Uniformity in the qualification of the teaching body is the privilege of only a few more advanced countries in the region. Teacher training is usually restricted to pre-employment training; in-service training and upgrading opportunities are meager. The resulting obsolescence of teaching practice is bound to have adverse effects on the learning process.

The absence of books and other learning materials is conspicuous in many parts of Latin America in spite of the fact that books have been identified as an important determinant of scholastic achievement. There is no lack of expertise in designing and writing textbooks, and the problems of printing and producing them are not insuperable—as is demonstrated by some efficient government-run textbook organizations. However, the problem of distribution is more serious; it is linked with the apparent inability of educational systems to "reach out" far enough into backward areas, which in turn is due to the absence of a strong and steady political commitment on the part of the governments.

There are many other reasons why the quality of education is probably not what it could be. Some of these reasons, such as inadequate facilities, teacher absenteeism, lack of support from mass media, are within the sphere of educational policy. Others, such as inadequate nutrition during early childhood, and poor family environment, are beyond its reach. In any case, all these factors account for the low "output" of education systems in terms of "production" of literate children.

C. EXTERNAL EFFICIENCY IN EDUCATION AND DEVELOPMENT POLICIES

The purpose of this section is to elucidate some of the relationships between education and development. It will show, first, that the type of educational growth observed in the region reflects a particular development strategy and, second, that new development strategies will require a different educational response in the future.

1. Education and economic development

The rapid expansion of educational systems during the sixties has led to significant increases in the average level of education of the adult population (see Table III-10). However, substantial differences between countries tend to persist. Argentina with 5.8 years of schooling for adults ranks first while El Salvador with 2.5 years of schooling illustrates the situation in Central American countries.

As a result of this general improvement in the general level of education, Latin American economies were able to draw on larger pools of better educated persons, which allowed them to achieve substantial progress during the last fifteen years. In all the countries, income grew faster than population, and consequently *per capita* income rose (see Table III-11). The growth of GNP *per capita* was substantial (over 3% a year) in the six countries that account for over 60% of the population.

Economic growth in the region was led by industry, which increased its share in total output in all countries. Ten countries, representing 89% of the total population of the region, have now built a significant industrial sector that accounts for over 30% of GDP. This drive towards industrialization was accompanied by the emergence of the region as an exporter of manufactures. In all the countries, the share of primary commodities in total merchandise exports fell and consequently the share of manufactures rose (see Table III-12). As a result, exports of manufactures now account for over 20% of total exports in eight out of 20 countries as against none in 1960.

In their haste to develop an industrial base, Latin American countries tended to take the shortest and most expensive route, namely the building of a so-called "modern" sector requiring high investment costs per job. In this sector, production techniques were characterized by technologies that were transferred from developed countries and were capital-intensive and labor-saving. Corporate ownership prevailed. Labor was relatively well paid and, sometimes, received fringe benefits similar to those of the developed countries. Other measures, such as over-valued exchange rates, favorable depreciation allowances, and subsidized interest rates, were frequently adopted to make capital cheaper. In agriculture, too, a modern, capital-intensive export-oriented sector was developed, often on the best available land. It was sometimes highly mechanized and, consequently, provided employment to only a small fraction of the agricultural labor force, the majority of which was engaged in subsistence farming. The exports of the modern agricultural sector helped to finance, sometimes to a large extent, the imports of capital goods required by the industrial sector.

Over the past twenty years, educational systems in Latin America responded to this development strategy by developing the upper levels of education. As a consequence of manpower studies emphasizing the importance of a strong body of professional manpower to staff the top jobs of the modern sector of the economy, the main objective of educational systems was the production of highly skilled manpower that only secondary and higher education could provide. An elite group of urban, industrial workers was also provided with good quality, high-cost vocational training to fill the lower echelons of the industrial labor force. Although this course of action was, in retrospect, a rational response to the strategies of economic development prevailing in the sixties, it also had a number of negative consequences that are becoming clearer and clearer every day.

First, the continuing expansion of secondary and higher education is less and less in line with the needs of the economy. As a result, the products of the educational system have more and more difficulty in finding jobs. Second, the continuous expansion of secondary and higher education is sending education budgets "through the roof." Since education expenditures are constrained by those of other sectors competing for public funds, quantitative expansion may lead to a deterioration in the quality of education. Third, the brain-drain—already a calamity for such countries as Argentina, Chile, and Uruguay—will expand to other countries. The cost of the present policy of high professional salaries adopted in some countries (Brazil, Mexico and Venezuela) to check the emigration of professional manpower will become prohibitive. Fourth, as a result of the pre-eminence accorded to secondary and higher education, primary education, adult education, and vocational training for small-scale industries are neglected. This policy will sooner or later put a brake on the spread of industrialization throughout Latin American economies. It will also help maintain the dualism between the modern and the traditional sectors and add to the already serious employment problem faced by many countries. Fifth, in rural areas, the absence of massive investments in agricultural education, extension, and literacy campaigns will jeopardize efforts aiming at rural development. Indeed, in the world, there is no example of sustained development, especially in rural areas, with illiteracy rates similar to those in the region. Sixth, educational systems as a whole are now designed for those who follow the royal road to the university, the lower cycles being considered suppliers of human inputs for the upper cycles. This situation is exemplified by examination systems that tend to reward the knowledge and skills needed to gain access to the following cycle instead of knowledge and skills that are immediately marketable on the job market. In other words, examinations are geared to the needs of those who are going to remain in the school system for further training—and who often represent a minority—instead of being geared to the needs of the majority, i.e., the school-leavers who are about to enter the labor market. Needless to say, examinations strongly influence the kind of curricula, teaching techniques, and attitudes that prevail in a given educational cycle. Perhaps the greatest damage resulting from the quasi-exclusive emphasis on the provision of education for highly-skilled manpower has been in the field of attitudes toward work. Certainly, the influence of the school is not the only one that helps to shape job selection. Social background and economic incentives are also important, but the formal education system has helped to degrade the status of non-professional occupations because of its emphasis on long, academic studies. Among other things, it has helped exacerbate the social dichotomy between the few who succeed in climbing the educational ladder and the majority who drop out along the way.

2. Toward a new model of development

In the economic field, the consequences of the development strategy described above are now well-known. In a context of rapid population growth, coupled with rural/urban migration, capital-intensive industrialization can provide jobs for only a fraction of the labor force. Labor productivity increases tend to take precedence over employment creation. Unemployment and underemployment spread throughout the labor force. Existing imbalances between regions and between the "modern" and the "traditional" sectors of the economy are exacerbated. In rural areas, reliance on a few export crops is a risky policy, the success of which depends on international prices, while the corresponding neglect of crops for local consumption leads to high imports of basic foodstuffs, which are costly in terms of scarce foreign exchange.

Income distribution worsens. Judging by the few serious studies available on this subject in Brazil,[10] Colombia,[11] Mexico,[12] and Peru,[13] the performance of Latin American countries during the sixties was as negative as their achievements in terms of economic growth were impressive. And there is now widespread concern about the meager benefits the high economic growth rates in the past fifteen years have brought to the poorest strata of society. The growing realization that equitable distribution of income is not an automatic corollary of growth has helped direct attention to a development strategy concerned with income distribution as well as growth itself.

This development strategy has been abundantly debated in international circles since 1972. The publications of the ILO, the World Bank, ECLA and other United Nations agencies on the subject are too well-known to be described here in full detail. As a reminder, it will be sufficient to say that:

> "Central to this new approach is the widespread inability of the modern sector of developing economies to make full use of the resources available to it—above all, the human resources. A number of countries, therefore, are considering a strategy based on a broader deployment of scarce capital throughout the economy, and a fuller use of available human resources. Translated into development objectives, this means that the creation of productive employment is being recognized as an economic goal as important as the growth rate of GDP.
>
> Fuller and more productive employment would also mean a more equitable distribution of income to the extent that the main beneficiaries—the unemployed and underemployed—are usually found among the less privileged strata of society. As the overwhelming majority of the very poor are engaged in subsistence farming, a poverty-oriented development strategy assumes that an important proportion of the new productivity will be stimulated in rural areas. Such a change in income patterns would increase the demand for such goods as basic foodstuffs, clothing and low-cost housing—which are usually produced locally (with low import content) by labor-intensive techniques."[14]

This new development strategy implies a new educational response that should be based on four basic priorities:

First, as development extends beyond the modern sector to embrace the "intermediary" and rural sectors of the economy, it will require a set of skills more broadly distributed throughout the social body and the geography of the country. In other words, emphasis should be on mass education rather than education for a social elite. In the formal system, this means that primary education should have priority over the other levels of education. Its coverage should be extended to the entire age-group concerned and its quality, enhanced. In short, it should become the basic education for all, which it was supposed to be in the first place.

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[10] Fishlow, Albert. Brazilian Size Distribution of Income. In *The American Economic Review*, May 1972, Papers and Proceedings of the 84th Annual Meeting of the American Economic Association, New Orleans, December 27-29, 1971. Langoni, Carlos G. *Distribuicão da Renda e Desenvolvimento Econômico de Brasil*, Editora Expressao e Cultura, Rio de Janeiro, 1973.

[11] Urrutia, Miguel and Clara E. de Sandoval, *La Distribución del Ingreso en Colombia.*

[12] Navarrete, I. de. La Distribucion del Ingreso en Mexico. In *El Perfil de Mexico en 1980*, Vol. 1, Mexico DF, 1970.

[13] Toledo, Alejandro. *Education, Employment and the Distribution of Labor Income in Peru between 1961 and 1972.* Unpublished Ph.D. Thesis, School of Education, Stanford University.

[14] World Bank. *Education.* Sectoral Working Paper, p. 14, 1974.

Second, vocational training—whether it is carried out within the formal education system or outside—should be vigorously developed. In practice, this means that, instead of concentrating high-cost vocational training on the very small fraction of the labor-force that will work in the modern sector, low-cost, locally-tailored training opportunities should be made available to the vast majority of the active population. The final objective should be the creation of a network of training opportunities emphasizing practical, immediately marketable skills.

Third, out-of-school education for adults and youth should be strengthened as their productive role increases. The main objective should be the eradication of illiteracy and the provision of basic skills for those who missed school during their early years. This policy would have a positive effect on the distribution of educational opportunities, which at present tend to overwhelmingly favor school-age youth over adults.

Fourth, priority should be given to education for rural development in three aspects: rural primary education, extension services, and farmer training. The problems of rural primary education are well-known: incomplete schools leading to high dropout rates at mid-course; underqualified teachers leading to low learning performance; lack of textbooks and other teaching materials; underadministration coupled with lack of inspection and teacher absenteeism. None of them is insuperable. It is perhaps more a question of political commitment than of financial resources.

The problems faced by extension services and farmer training are more difficult to solve because they are closely connected with the hesitations of rural development policies in such areas as land tenure, crop selection, water policies, rural credit, and pricing of basic foodstuffs.

D. THE FINANCING OF EDUCATIONAL DEVELOPMENT

The purpose of this section is not to present an accurate costing of each of the policy changes proposed in the preceding section but, more simply, to outline the implications of these policy changes in terms of educational costs and financing.

Before this is done, it may be useful to ask whether past trends in education costs and financing can be extrapolated in the future. Section A has shown that the share of education in both public budgets and GDP's has increased substantially in the past. The question now is: Will present trends continue? Put in this way, the question has no answer unless one wants to play prophet. It can, however, be safely predicted that, as a result of the "new look" in development strategies, public budgets will in the future be more geared to employment creation by productive activities than to education, especially in a context of the brain-drain and unemployment of school-leavers. As a result, educators will almost certainly be invited to take a more critical look at their own budgets, their unit costs, the internal efficiency of education systems, and the impact of education subsidies on income distribution.

A more realistic way of looking into the future of education budgets is to put the question in normative terms: Should present trends continue? In order to answer this question, it is necessary to look into the issue of allocation of resources among levels of education within the education sector. Past trends do reflect the priority granted to the upper levels of education at the expense of primary education.

The main theme of this paper has been that this educational policy—perhaps justified ten or fifteen year ago—is now generating adverse consequences in many Latin American countries. In short, the time has come for a reversal, which implies a difficult reallocation of resources within education budgets. Thus, the question is not so much to predict what is going to happen to the share of education budgets in total public budgets or GDP as to convince education authorities that a serious reordering of priorities is called for. Taking the argument to the extreme, one would argue that there is little point in advocating an increase in this share if the same policies are pursued in the future.

Together with the level of enrollment, public expenditures per student are a component of the distribution of resources within the education budget. When confronted with figures on unit costs in education, policy-makers invariably ask: Are these expenditures per student too high or too low for Latin American countries? There is no easy or definite answer to this question because it all depends on the quality of the education sought. But, here again, international comparisons can be helpful. In Table III-13 expenditures per student are expressed in percentages of GDP per capita in order to compare the relative "burden" of education on the economy in three areas of the world.

On the whole, the African countries have selected a pattern of unit costs that puts a very heavy burden on their economies across the board. Latin American countries behave differently. At the higher level, unit costs also represent a high proportion of their GDP's, not as high as in Africa but higher than in the OECD countries. At the secondary level, the "burden" is roughly the same as in the OECD countries and, at the primary level, it is clearly less. Thus, unlike the African countries, there is some presumption that Latin American countries could afford to spend more per student at the primary level than at present.

It should also be borne in mind that the considerable differences in expenditure per student between levels of education in Latin America may be explained by the poor quality of primary education. Thus, high expenditures per student in secondary education are needed to offset the academic backwardness of primary school leavers and the same applies to university education as regards secondary school leavers. In other words, higher expenditures per student in primary education may succeed in lowering expenditures per student in the subsequent levels if they produce an improvement in the quality of primary education.

Still, it is possible to speculate about the consequences of the policy changes proposed in this paper on education budgets. First, those changes amount to a reordering of priorities away from high-cost levels of education (secondary and higher) towards low-cost levels of education (primary, literacy training, rural education, and vocational training). As such, the impact of the changes on education budgets should be beneficial. Second, the development of certain types of education and training—traditionally not financed under ministry of education budgets—would make it possible to tap non-budgetary sources of finance more actively. The experience of vocational training financed by a payroll tax has demonstrated the existence of non-budgetary resources that can be mobilized to support certain types of training. Thus, these policy proposals would result in a better overall mobilization of resources for education.

Third, the priority given to primary education would imply additional public outlays at this level. Out-of-school children at this level are mostly underprivileged children in urban areas and rural children in remote areas, and they may require special compensatory programs and *ad hoc* aid schemes. The urgent need to improve the quality of education in order to produce literate children means better teachers, more equipment and textbooks, and better supervision. As a result, an increase in unit costs and total costs can be expected in the short term. However, these additional outlays would, in the long run, help boost retention rates and therefore decrease the costs per graduate. They should be considered an investment necessary to improve the internal efficiency of the system.

All in all, the proposed changes in priorities are probably not going to reduce the rate of increase of educational expenditures. But this would be of little concern to many observers if steps were taken to reconcile them with the development strategy they are supposed to serve.

STATISTICAL APPENDIX

Table III-1. Latin America: Public Expenditures on Education, 1960 and 1975

	Number of countries	
	1960	Circa 1975
1) As a proportion of the public budget:		
Less than 10%	2	—
Between 10 and 15%	8	6
Between 15 and 20%	5	6
Between 20 and 25%	2	3
Over 25%	3	5
Total	**20**	**20**
2) As a proportion of GNP:		
Less than 2%	7	2
Between 2 and 3%	8	7
Between 3 and 4%	4	6
Over 4%	1	5
Total	**20**	**20**

Source: UNESCO. Evolución y Situación Actual de la Educación en América Latina. Santillana S.A. de Ediciones, 1977.

Table III-2. Latin America: Trends in Enrollments (%), 1960–75
(Average increase per annum)

	1960–65	1965–70	1970–75	1960–75
Primary education	5.6	5.4	3.9	5.0
Secondary education	10.4	8.3	9.3	9.3
Higher education	9.8	12.4	16.1	12.7

Source: UNESCO. Office of Statistics.

Table III-3. Latin America: Relative Unit Costs
(circa 1973)

	Primary level	Secondary level as multiple of primary level	Higher level as multiple of primary level
Latin American Countries	100	200	1,100
OECD Countries	100	130	340
African Countries	100	600	5,500

Source: Zymelman, Manuel. Patterns of Educational Expenditures. World Bank Staff Working Paper No. 246, 1976.

Table III-4. Latin America: Past Trends in Allocation of Public Expenditures on Education by Level
(approximately 1964–1973)

	Number of countries in which the share of the education budget assigned to:	
	Primary education[1]	Higher education
Latin American countries		
is decreasing	12	5
is stable	2	2
is increasing	6	13
Total	**20**	**20**
OECD countries		
is decreasing	8	10
is stable	4	5
in increasing	8	5
Total	**20**	**20**

Source: UNESCO. Statistical Yearbook 1975.

[1] Includes pre-primary education.

Table III-5. Latin America: Literacy Situation Circa 1970

Illiteracy rates	Total population aged 15+	Rural females aged 15+
Less than 20%	7 countries	3 countries
Between 20% and 40%	7 countries	5 countries
Between 40% and 60%	4 countries	5 countries
Over 60%	2 countries	7 countries

Source: UNESCO. Statistics of Educational Attainment and Illiteracy 1945–1974, Statistical Report No. 22.

Table III-6. Latin America: Enrollment of the 6–11 Age Group, 1960–75

Countries	Gross enrollment ratios in primary education[1]		Out-of-school ratios for the 6–11 age group[2]	
	1960	1975	1960	1975
Argentina	113.6	127.1	8.8	—
Uruguay	111.1	94.8	10.1	29.0
Venezuela	94.9	95.5	31.2	25.4
Dominican Republic	93.5	108.0	33.3	23.1
Costa Rica	91.1	109.4	25.8	5.5
Guatemala	42.7	63.1	68.0	52.0
Mexico	[illegible]	113.4	41.6	9.8
Nicaragua	[illegible]	82.1	56.9	44.3
Panama	[illegible]	123.5	32.0	5.8
Chile	107.3	150.7	21.1	—
Brazil	70.9	115.7	52.3	29.9
Colombia	62.4	87.6	52.1	35.3
Ecuador	83.1	101.6	33.6	21.1
Guyana	106.7	95.5	9.1	13.5
Paraguay	97.7	102.4	30.4	24.2
Peru	86.4	115.9	43.3	20.2
El Salvador	76.3	103.0	47.7	37.7
Honduras	65.5	88.5	50.5	33.1
Bolivia	61.3	96.9	53.7	32.8
Haiti	44.8	52.0	66.4	61.0
Total	**80.5**	**118.5**	**43.2**	**23.2**

Source: UNESCO. Office of Statistics.

[1] Total enrollment in primary education as a proportion of population in age group 6–11.

[2] Out-of-school population aged 6–11 as a proportion of population in age group 6–11.

Table III-7. Brazil: Out-of-School Ratios by Socio-Economic Groups, 1970

	Age percentages								
	6	7	8	9	10	11	12	13	14
Brazil									
Urban Males	67	31	17	12	13	22	33	46	59
of which: those with a low SES*	72	45	31	27	28	32	41	50	61
Urban Females	65	30	16	11	12	22	37	52	66
of which: those with a low SES	70	43	30	25	26	31	41	52	64
Rural Males	85	65	53	44	44	40	48	54	66
of which: those with a low SES	97	71	62	55	54	51	56	61	69
Rural Females	84	64	52	44	43	41	50	58	69
of which: those with a low SES	86	71	61	54	53	51	57	63	72
State of São Paulo									
Urban Males	79	28	9	5	6	22	40	56	70
of which: those with a low SES	88	53	39	37	39	47	61	72	81
Urban Females	79	27	9	6	6	25	47	65	77
of which: those with a low SES	88	53	37	35	38	50	65	78	85
Rural Males	89	48	25	17	15	21	38	56	73
of which: those with a low SES	92	64	47	42	40	45	56	69	82
Rural Females	89	49	26	18	18	29	49	68	82
of which: those with a low SES	92	64	48	42	42	50	61	76	88
State of Pernambuco									
Urban Males	58	35	27	20	21	23	30	39	52
of which: those with a low SES	69	49	41	37	36	39	44	50	59
Urban Females	56	33	24	18	18	21	29	42	55
of which: those with a low SES	66	48	40	34	34	35	40	48	61
Rural Males	86	75	68	62	59	57	60	61	66
of which: those with a low SES	88	77	72	66	62	61	64	65	70
Rural Females	84	72	66	59	57	54	55	56	62
of which: those with a low SES	86	75	70	63	61	58	59	61	65

Source: IBGE. Departamento de Censos. Unpublished tabulations drawn from a 25% sample of the 1970 Population Census.

*Low socio-economic status (SES): children living in families where the head of family earns less than 200 cruzeiros per month.

Table III-8. Latin America: Internal Efficiency in Primary Education Circa 1975

	Overall repeater rates %[1]	Input/output ratio[2]
Argentina	9.5	1.4
Uruguay	13.1	1.4
Venezuela	2.9	1.3
Dominican Republic	23.5	2.4
Costa Rica	6.4	1.3
Guatemala	16.4	2.1
Mexico	10.4	1.3
Nicaragua	11.6	2.1
Panama	11.7	1.4
Chile	12.1	1.6
Brazil	16.1	1.9
Colombia	15.6	2.0
Ecuador	11.9	1.4
Guyana	7.9	1.1
Paraguay	16.9	2.1
Peru	9.2	1.6
El Salvador	15.7	1.9
Honduras	n.a.	n.a.
Bolivia	n.a.	n.a.
Haiti	n.a.	n.a.

Source: UNESCO. Office of Statistics.

[1] Total number of repeaters enrolled in year t + 1 as a proportion of total enrollment in year t.

[2] Number of student-years per student reaching the last grade divided by the legal number of years in the cycle.

Table III-9. Latin America: Retention Rates Throughout Primary Education Circa 1975
(Both sexes)

	Percentage of students enrolled in grade 1 reaching					
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Argentina	100	89	86	82	76	71
Uruguay	100	100	97	93	86	80
Venezuela	100	91	88	76	70	66
Dominican Republic	100	64	53	41	33	28
Costa Rica	100	80	80	77	66	66
Guatemala	100	65	52	41	33	30
Mexico	100	81	75	69	65	62
Nicaragua	100	58	48	39	33	28
Panama	100	90	86	82	78	75
Chile	100	89	85	81	76	71
Brazil	100	54	46	39	35	30
Colombia	100	68	56	41	31	—
Ecuador	100	79	72	67	61	59
Guyana	100	97	97	93	84	84
Paraguay	100	85	73	60	49	39
Peru	100	83	77	71	65	60
El Salvador	100	72	59	50	43	38
Honduras	100	n.a.	n.a.	n.a.	n.a.	n.a.
Bolivia	100	n.a.	n.a.	n.a.	n.a.	n.a.
Haiti	100	n.a.	n.a.	n.a.	n.a.	n.a.

Source: UNESCO. Office of Statistics.

Table III-10. Latin America: Average Number of Years of Schooling of Adult Population in Selected Countries, 1960–70

	1960	1970
Argentina	4.8	5.8
Chile	5.0	5.4
Costa Rica	3.9	4.9
Dominican Republic	2.3	3.0
El Salvador	1.8	2.5
Mexico	2.6	3.3
Panama	4.1	4.9

Source: Derived from Table 11 in Expansión Educacional y Estratificación Social en América Latina 1960–70. Proyecto Desarrollo y Educación en América Latina y el Caribe. UNESCO-CEPAL-UNDP. September 1977.

Table III-11. Latin America: Growth of GNP per Capita, 1960–76

Average annual growth rate (%)	Number of countries	Percentage of population (1976)
Less than 1	3	5.8
1–2	2	2.3
2–3	8	31.0
3–4	5	25.2
Over 4%	1	35.7

Source: World Bank. World Development Report, 1978.

Table III-12. Latin America: Index of Industrialization, 1960–1976

	Number of countries	
Share of industry in gross domestic product	1960	1976
Less than 15%	1	0
15–20	5	1
20–30	9	7
30–40	3	8
Over 40%	0	2
Share of manufactures in merchandise exports		
Less than 5%	15	3
5–10	2	3
10–20	1	4
20–30	0	6
Over 30%	0	2

Source: World Bank. World Development Report, 1976.

Table III-13. Latin America: Unit Costs as a Percentage of GDP per Capita

	Primary level	Secondary level	Higher level
Latin American countries	11	22	121
OECD countries	16	21	55
African countries	22	130	1.200

Source: Zymelman. Manuel. Patterns of Educational Expenditures. World Bank Staff Working Paper. No. 246. 1976.

CHAPTER IV

Analysis and projection of educational expenditures in Latin America

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INTRODUCTION

The general purpose of this study is to develop projections of the financial resources that will be required to meet the demand for formal education in Latin America resulting from the probable behavior of a set of factors beyond the control of educational development planners. The authors have also attempted to estimate the proportion of these resources that will have to be provided in the form of government contributions, as well as the impact these contributions will have on government budgets and gross national products.

Recent developments in the school systems of the region are then examined in order to identify the causal factors. Extrapolations (which have been obtained independently) of the future behavior of those factors are then made in order to project the demand at the various educational levels. Finally, an estimate is made both of the financial resources that will be necessary to meet the demands thus projected, and of the proportions of those resources that probably will be contributed by the private sector in each country.

The projections show that the educational demand considered in the study will tend to increase from 1980 onwards at a slower pace than in the present decade. Therefore, the additional pressures that may continue to be generated in the future—to increase expenditures on education more rapidly than government budgets—will be due to factors that are within the control of the planners of economic and social development. These factors would include lack of opportunities to participate appropriately in the economy and a rise in the operating costs of educational systems.

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A. DETERMINANTS OF THE DEMAND FOR EDUCATION

1. Productivity *per capita* and impact on gross national product of public expenditures on education

Previous investigations have concluded that, for the Latin American countries as a whole, there is no significant relationship between *per capita* productivity and the impact on the gross national products of public expenditures on education (7, p. 108). On the other hand, observations have shown that enrollment ratios in primary, secondary and higher education are positively related to gross national products *per capita* (ibidem). (To illustrate this point, Table IV-1 ranks the different countries in accordance with these indicators.) Thus, although there is a clear relationship between educational demand (expressed in real terms—that is, by means of enrollment ratios) and *per capita* productivity levels, there is no such relationship between educational supply (expressed in terms of the impact of public expenditures on education on the *per capita* products) and *per capita* indicators of productivity.

The weakness of the relationship between *per capita* national product and the relative proportion of public expenditures on education is attributable to several factors. First, enrollment in private sector institutions varies among countries and among educational levels (cf. OAS, 1971). Second, among the various countries, the unit costs of each educational level do not bear a stable relationship to *per capita* productivity, which indicates that the cost structure is not determined by the average standard of living that prevails in each country (cf. Table IV-2). The ratio of *per capita* gross national product to unit cost ranges from 0.03 to 0.26 in primary education, from 0.21 to 1.4 in secondary education, and from 0.47 to 4.2 in higher education.

Now, the pattern of educational development in each country—in relation to its economic development—may be different because of certain historical factors and other conditions specific to the respective countries. It may be recalled that international studies analyzing variations in productivity have not been able to explain more than 50% of those variations in terms of differences between the educational attainment of the labor force in different countries (5). More recent investigations have helped to explain these differences between the actual capacity of educational attainment to predict productivity and what had been assumed during the past decade. In essence, these differences are due to the fact that the supply of workers who complete specific school grades is increasing faster than the jobs available for each educational level (3), which causes a rise in the level of education required to perform the various jobs (4) and (1). It also causes a decrease in the expected income differentials corresponding to the different school levels (3), as well as a "disorder," in aggregate terms, between the amount of schooling demanded and that which—based on the historical experience of other countries—would have corresponded to the productivity levels of the labor force in the Latin American region (2). In other words, the levels of schooling of the labor force affect the skill levels that the labor market requires for performing different jobs. These requirements in turn affect the educational aspirations of students, this being the origin of the "spiral of educational requirements" that has been studied in the investigations cited above. Thus, there is a causal relationship between the educational attainment of the labor force and levels of productivity (represented by occupational categories and income differentials). However, this relationship is not as stable as that underlying the "manpower approach" that was in vogue among educational planners in the 1960's, since, regardless of the fact that that relationship stems from "manpower requirements," a dynamic analysis of such requirements shows that they tend to change as a result of the changes they themselves undergo over time.

2. Theory of the determination of the demand for education

The fact that, on the one hand, we have observed that the relationship between educational supply and *per capita* productivity is not significant for the Latin American countries as a whole, and that, on the other hand, we have begun to detect that the relationship between the levels of productivity and the education acquired by the labor force does not behave in a stable manner, precludes the use of indicators of *per capita* productivity to predict the financial resources that will be necessary to satisfy the demand for education that will be generated in the coming years in Latin America. In contrast, the correlation between the social position of families and the amount of education they acquire has been repeatedly confirmed. This has been attributed to the fact that education is regarded as an instrument that (at least potentially) makes it possible to maintain or improve the socioeconomic status of the family between generations. Furthermore, since the amount of schooling required for performing a given job has been increasing over time, educational aspirations also tend to be greater in each of the social strata. For this reason it has been said that education is a "positional good"—in the phrase of F. Hirsch—i.e., "a good whose individual utilization, and the benefits it entails, depend entirely on the extent to which it is generally available, i.e., on the extent to which that good is within the reach of the entire society. . . . At a certain point the advantages offered by this good cease to be such, which makes it necessary to seek other resources in order to maintain the privileges that that good can no longer provide" (6, p. 106). Consequently, each family attempts to obtain for its members the maximum amount of education compatible with its social position. In microeconomic terms this implies that each consumer unit will attempt to save (in order to invest in education) the proportion of its income necessary for each of its members to obtain, in the future, the maximum level of welfare that can be gained from the income now available to that unit—considering that at a level of welfare similar to the present one, the family will probably require more schooling than that obtained by the head of the family unit in question.

It therefore follows that the demand for education is generated by social factors that may be grouped into two analytical categories. The first category comprises those phenomena that are exogenous to educational planning. They include: population growth, urbanization, the increase in the social strata that have real capacity to demand schooling (at various levels and of various types), and the participation rates of the population (of different ages and of each sex) in economic activity. The second category comprises phenomena which, by reason of their nature, may be controlled by the mechanisms of educational planning (which is viewed as a process that regulates the relations between the educational system and the economic system). Among these phenomena are: the educational density of occupations (that is, the schooling the labor market demands for the performance of different jobs—insofar as this is the result of the balance between the schooling of the supply and that of the labor demand); and the behavior of educational costs (which are the result of the decisions taken on the remuneration of the factors involved in the generation of schooling as well as the technologies used to generate it).

In order to use this theory in an exercise aimed at predicting the behavior of the demand for education, it was decided to develop a model that regards the variables exogenous to educational planning as predetermined. The rationale for this decision is to develop a simulation exercise aimed at anticipating the size of the demand for education that will arise from those events which—in any case—must be foreseen. Once this demand has been projected, those who have the necessary capacity to take decisions about the economic and social development of the different countries could consider separately the impact these phenomena that are more directly subject to their control would have on that demand. In other words, the purpose of developing a model of this kind was to provide decision-makers with information on the financial requirements that will have to be foreseen in order to satisfy that part of the demand for education that cannot be controlled by them. To these estimates, the educational planners could add those derived from other processes that can be more easily modified through economic and social development planning.

3. Application of the theory

a. Dependent variables[3]

The demand for education is represented by gross ratios of enrollment, which measure, for each educational level, the capacity to enroll the demographic cohort that potentially could demand education at that level. These variables are:

(P) = Demand for primary education;
(M) = Demand for secondary education;
(S) = Demand for higher education.

The demand for primary education (P) is represented by the relationship between enrollment at this level and the population aged 6 to 12 years; the demand for secondary education (M) is represented by the relationship between enrollment at this level and the population aged 13 to 18 years; the demand for higher education (S) is measured in terms of the relationship between registration (or enrollment) at this level and the population aged 19 to 24.

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[3] It should be emphasized that the dependent variables of this model are the educational demand, expressed in real terms, for different educational levels. This demand is correlated with *per capita* income, as Table IV-1 shows. What is not related to income is the monetary expression of that demand; this is not due to variations in private sector participation as in the financing of education but rather and essentially to international variations in educational costs (at the various levels). Therefore, the reduced equation of this model would show correlations between *per capita* income and its endogenous components.

b. Independent variables

To obtain indicators that would provide an idea of the characteristics of the social structure of the countries, and thus of the way in which income is distributed in each country—as well as of the cultural values that induce the demand for education—we used variables that refer to three dimensions of these phenomena, namely: prevailing standards of living; rates of participation in economic activity; and the degree of urbanization achieved in the various countries.

i) Living conditions

This group of variables consists of:

(E) = Consumption of energy;

(TN) = Birth rate.

The relationship between (E) and income level is quite obvious. As for (TN), it must be noted that several sociodemographic studies have found strong inverse correlations between family income levels and birth rates, which have been ascribed to several factors: when families receive low incomes, they have a tendency to produce more children, owing to such economic factors as insecurity about having the means of subsistence in old age, or the need for cheap labor to help with farm work; and sociocultural factors (such as family instability and the non-monogamous marriage patterns that are found to be associated with the culture of poverty). On the other hand, as family income rises, the birth rate declines, since it is no longer necessary to have children in order to subsist during old age; there is no longer a need for cheap labor to guarantee the family income; the social strata reached are those in which the family tends to be more stable (or, in any event, capable of practicing birth control); and—a fundamental element—the family achieves a social position that must be preserved or improved between generations. For obvious reasons the latter is possible only if the number of offspring is limited.

ii) Rates of participation in economic activity

This group of variables comprises:

(PM) = Rates of participation of males in economic activity

(PF) = Rates of participation of females in economic activity

The reason for the inclusion of these variables is that, in applying the theory described above, we opted to test the hypothesis that the demand for education is directly related to the rate of participation of females in economic activity and inversely related to the rate of participation of males. The reasons for the first relationship are of two kinds: on one hand, the incorporation of women into the economy favors a better distribution of family income and, on the other hand, such integration is associated with higher levels of education for women. It is therefore characteristic of groups situated at intermediate and higher social levels.

At the same time, we expected to find an inverse relationship between the rate of participation of males in the economy and the demand for education. The reasons underlying this hypothesis are: first, when young men leave the school system prematurely, they tend to take part in economic activity in some way; and, second, the participation of these young men in economic activity is generally associated with low family income levels. In short, we began with the assumption that the rates of participation of males in economic activity reflect the extent to which the groups that may demand education have matured in the different countries.

iii) Degree of urbanization

The following variables were used as proxies for this indicator:

(PU) = Percentage of the urban population in the total population of each country

(CU) = Growth rate of the urban population from 1965 to 1970.

As may be easily seen, the first of these variables represents the levels of urbanization achieved in the various countries, while the second reflects the rate at which this process is taking place. We expected to find a direct relationship between the demand for education and indicators of urbanization, since several studies have found this phenomenon to be one of the main determinants of educational attainment in Latin America (2).

4. Data used

To construct the dependent variables we used information provided by UNESCO and by the Latin American Demography Center (CELADE).

The independent variables referring to demographic indicators (birth rates and rates of participation in economic activity) were also constructed from data provided by CELADE; the others were based on data published by the University of California at Los Angeles (UCLA). Similarly, the projections of the demographic variables (which served as parameters to estimate the values that would be taken by the dependent variables) were also made by the Latin American Demography Center. Projections of the other variables were made by us on the basis of the geometric growth rates observed for each indicator, in each country, between 1960 and 1970.

5. Estimation of regression equations

As is well known, the investigations carried out in different fields of the social sciences often use the same methods but for different purposes. Specifically, regression analysis is normally used for explanatory purposes and for purely predictive purposes. In econometrics, this analysis is used to solve problems relating to the statistical explanation of various phenomena: and this imposes a number of constraints on this analysis which, if they are not observed, can generate deviations in the results obtained from it. On the other hand, in other fields of the social services, regression analysis is also used as a statistical method to predict the values taken by a specified dependent variable when the independent variables (represented in the form of vectors) move between various spatial points.[4]

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[4] The relevant literature is abundant. The mathematical grounds that validate the use of this method (for predictive purposes) without the need to observe (with the rigor imposed for other uses) the above-mentioned constraints may be found in: Draper, N. R. and H. Smith, *Applied Regression Analysis*, John Wiley & Sons, New York, 1968. Several examples (and statistical methods for determining the degree of validity of the models developed for this purpose) were provided by: Kerlinger, Fred and Eleazar J. Pedhazur, *Multiple Regression in Behavioral Research*, Holt, Rhinehart and Wilson, New York, 1973.

Therefore, in order to predict the magnitude of the demand for education that will be generated by factors exogenous to educational planning, our starting point was a cross-section analysis that included information for 1970 for the 18 countries considered in this study. We obtained the following equations:

a. Demand for primary education

$$\begin{array}{llll} (P) = 238.347 - 2.05287 & (TN) - 1.43463 & (PM) \pm 14.41373 \\ \quad t = 4.2865 & \quad t = 1.8280 & \\ \quad p < .001 & \quad p < .10 & \\ \quad R^2 = 0.551 & \quad F = 9.188 & \end{array}$$

b. Demand for secondary education

$$\begin{array}{llll} (M) = 78.264 - 1.84252 & (TN) + 0.89049 & (CU) \pm 7.09047 \\ \quad t = 4.2667 & \quad t = 1.8485 & \\ \quad p < .001 & \quad p < .10 & \\ \quad R^2 = 0.686 & \quad F = 16.357 & \end{array}$$

c. Demand for higher education

$$\begin{array}{llll} (S) = 12.565 - 0.18713 & (TN) + 0.00156 & (E) \pm 1.68453 \\ \quad t = 3.1294 & \quad t = 2.0125 & \\ \quad p < .001 & \quad p < .10 & \\ \quad R^2 = .660 & \quad F = 14.559 & \end{array}$$

In order to estimate these equations, the variables of the model described above were incorporated by means of a procedure similar to the one known as "step-wise regression." The variables that proved significant in the three equations appear in them with the corresponding signs.

Furthermore, in all three cases the inclusion of the second variable permitted a significant improvement in the coefficient of multiple determination.

As expected, the demand corresponding to these three levels of education depends on the living conditions of the population, which were represented by birth rates (in the three cases) and by the average consumption of energy, in the case of higher education. Furthermore, the demand for secondary education depends on the growth rate of the urban population, while the demand for primary education can also be predicted on the basis of the rate of participation of males in the economically active population (which is attributable, as we have already said, to the inverse relationship that can be expected between the enrollment of males—at the elementary level—and their participation in economic activity). It is also interesting to note that neither the rate of participation of females in economic activity, nor the average proportion of the urban population of the various countries, appeared with significant coefficients in the regression analysis.

B. PROJECTION OF THE DEMAND FOR EDUCATION

1. Methodology

The enrollment coefficients for the three educational levels for the years 1980, 1985 and 1990 were based on the foregoing equations. The combination of these coefficients with projections of the population within each age cohort (6 to 12 years for primary education, 13 to 18 years for secondary education, and 19 to 24 years for higher education)—which were prepared by CELADE, as already indicated—gave alternative estimates for the future behavior of school enrollment. For this purpose two hypotheses were developed for the primary and secondary levels, and three hypotheses for the higher level.

a. Hypothesis 1

This hypothesis states that the coefficients for each educational level, in each of the countries considered, will continue to "diverge" from the model estimated here, in the same proportion and direction as in 1970. The reason, of course, is that factors exogenous to the model will continue to affect the dependent variables, which, in turn, will have the same relative strength and follow the same direction as the effects these factors had in 1970. (It should be recalled that the exogenous factors explain 31% to 45% of the variances of the respective dependent variables.) To estimate this "relative strength," each of the projected coefficients was adjusted by the following formula:

$$C_{tj} \pm (e/y)\, C_{tj}$$

C_{tj} = Coefficient of school enrollment projected for level i, country j, in year t.
e = Error observed in 1970 at level i in country j.
y = Value in 1970 for the coefficient of level i in country j.

b. Hypothesis 2

This hypothesis states that the coefficients for each educational level, in each of the countries considered, will continue to diverge from the model estimated here in the same direction as in 1970, but with a proportional strength equal to the "standard error" calculated for each equation, on the basis of the data for that year. Accordingly, each of the coefficients was adjusted by the following formula:

$$C_{tj} \pm (s/y)\, C_{tj}$$

s = Standard error estimated for the equation in which level i appears as a dependent variable.
y = Value in 1970 for the coefficient of level i in country j.

c. Hypothesis 3

In the case of higher education, a third hypothesis was developed in an attempt to broaden the margin of the projections (thereby reducing the error of estimation). This hypothesis states that the coefficients for this level of education, in each of the countries considered, will diverge from the model estimated here in a direction opposite to that observed in 1970, and in a proportion equal to the "standard error" observed in each equation, on the basis of the data for that year.

2. Results

Tables IV-3 and IV-4 show the minimum and maximum estimates derived from these hypotheses. It is inferred from these estimates that, between 1970 and 1990, total enrollment at the primary level will increase between 60.1% and 72.4%; enrollment in secondary education will increase between 130.7% and 180.4%; and enrollment at the higher level will increase between 76.6% and 260.2%. The average of the gross coefficients of enrollment in 1990 will remain at about 90% in primary education; it will approach 50% in secondary education; and the coefficient for higher education will be about 11%[5]. Finally, the geometric growth rates of enrollment reflect interesting trends. Those for primary education, which have been increasing by an average of over 4% a year, will continue to grow at a rate of about 3%; those of secondary education, which increased from 10.8% to 12.6% between 1964-67 and 1970-73, will rise by 8% up to 1980, and will continue to increase thereafter by 2% annually. Furthermore, the growth rate of enrollment in higher education—which had accelerated from 9.4% to 18% between the periods just mentioned—will decline to 9.1% by 1980, to 4% between 1980-85, and to 3.4% between 1985-90. (All of these figures are based on weighted averages.)[6]

It should be borne in mind that these projections reflect the consequences that expected changes in the structural characteristics of the various countries will have on the demand for education. Needless to say, they cannot reflect the impact in each country (or group of countries) that may result from any substantial change in priorities for resource allocation at the various educational levels (although, in the case of higher education, we have considered the possibility that exogenous factors that are responsible for the deviations noted between the model and the situation in 1970, will, on average, operate in the future in a direction opposite to that observed in 1970).

Moreover, it must be borne in mind that the coefficients of primary school enrollment reflect "gross ratios"; therefore, they have not been adjusted by the proportions of enrolled students whose ages exceed those that would theoretically correspond to that educational level. With few exceptions, the projected coefficients are not high enough to absorb the entire demographic cohort between 6 and 12 years of age. This indicates that the problems that now affect rural education in the region will probably persist. Therefore, it will be necessary to continue seeking and testing educational methods and procedures (intra- and extra-curricular) which, being oriented toward an increase in the effective demand for formal education—through an improvement in retention rates—will make it possible to progress in the years ahead toward a lesser imbalance between urban and rural education in Latin America.

C. FINANCIAL PROJECTIONS

1. Total expenditures on education

Tables IV-5 and IV-6 show the minimum and maximum estimates of the financial requirements corresponding to the projections of enrollment presented in the preceding chapter. Educational expenditures are expressed in 1970 United States dollars and have been projected on two assumptions: that, when expressed in constant terms, they will remain at the same level in each country as in 1970, and that the cost of private schools is equal to that of public schools at the same educational level. (This may lead to an underestimation of total expenditures; unfortunately, however, we lack sufficiently reliable information to eliminate this assumption in most countries.) Capital expenditures refer to the annual average outlay that would be required to increase the capacity of each educational level at the rate considered in the projections.

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[5] See Tables A-IV-10, A-IV-11 and A-IV-12 in the Appendix.

[6] See Tables A-IV-13 and A-IV-14 in the Appendix.

In order to estimate the impact of these projected figures on the gross national product of each country, we developed several hypotheses. These hypotheses are based, on the one hand, on estimates of the financial requirements derived from the minimum and maximum projections under the assumptions made about the growth of enrollment. On the other hand, two considerations were taken into account in relation to the future growth of the gross national product in the countries considered. To define these assumptions, we analyzed GNP increases in the various countries from 1960 to 1974 and obtained the average annual rates for each of the three five-year periods included. The lowest rate (of the three for each country) was used to develop the assumption of "slow growth," and the highest rate was used to develop the assumption of "rapid growth." The two extreme hypotheses of the relationship between educational expenditures and gross national product which appear in Tables IV-7 and IV-8 show that, in the first case, the proportions for 1990 range from 1.0% to 4.2% (average = 1.5%) and that, in the second case, they fluctuate between 1.7% and 9.3% (average = 3.6%). It is interesting to observe the changes in the ranking of the various countries under each of the hypotheses mentioned.

2. Trends of public expenditure

a. Projections of government expenditure

Assuming that the proportional participation of the public sector in the financing of each educational level will continue at the same level as in 1970, we obtained the estimates shown in Tables IV-9 and IV-10 (Table IV-11 shows the growth rates corresponding to these projections). As may be seen, the expectation is that, on average, public expenditures will increase between 1973 and 1980 at the same rate as between 1960 and 1973 (6.5% annually). Beginning in 1980, however, the rate of increase of these expenditures will fall to 2.6%. Nonetheless, considering the countries individually, we find that in seven (Brazil, Chile, Dominican Republic, El Salvador, Guatemala, Mexico and Paraguay) the increase in public expenditures projected for the period 1973–80 (maximum estimate) will be more rapid than that observed between 1960 and 1973.

b. Relationship between government expenditures on education and gross national product

On the basis of the same assumptions regarding the growth of the various national economies, we have estimated the proportion of the gross national product that, under these assumptions, would have to be allocated to the financing of public education. (These estimates are summarized in Tables IV-12 and IV-13.) Under the most unfavorable assumption, it can be anticipated that, in 1980, 12 countries will have increased the proportion of the national product they allocated for this purpose in 1973, while, in 1990, nine countries will be in this situation: Bolivia, Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico and Uruguay; in only five cases, however, will the increase be one percentage point or more.

c. Relationship between public expenditures on education and government budgets

These projections of public expenditures, combined with the assumptions that we have made about the growth of the gross national product, also serve as the basis for estimates of the impact these expenditures would have on government budgets (assuming that the existing relationship in 1970 between the government budget and gross national product of each country remains constant). Under the most unfavorable assumption (slow economic growth combined with the maximum estimate of educational expenditures), eight countries in 1980, seven in 1985 and six in 1990 will have to increase the proportion of the budgets they allocated for this purpose in 1973. All of the aggregate estimates show the effect of the projected decline in the growth rate of expenditures allocated to the financing of public education (cf. Table IV-14).

3. Criticism of the projections

As we pointed out, these projections are based on different assumptions. Some of them refer to the internal structure of the educational expenditures, and others are related to the behavior of given factors external to the educational system.

With respect to the structure of the expenditures, we started from the assumption that the expenditures per student that correspond to the three educational levels will remain constant, as expressed in internationally equivalent monetary units. Obviously, this assumption can be fulfilled only if, in each country, the educational expenditures per student maintain the same relationship to the currency used here as a unit of comparison. On the other hand, to fulfill this assumption, it will not be necessary for the expenditures per student to behave in the same way as the internal inflation rates in each country (since occasionally there will be discrepancies between the price indexes and the changes in the exchange rate). The principal reason for starting from this assumption is that it is difficult to anticipate the direction of the policies countries will adopt regarding the remuneration levels of the factors that intervene in the educational process, and the intensity with which these factors will be used in the future. The experience of other countries with a higher level of economic development is not necessarily useful in anticipating what will occur in Latin America, since we have been accumulating information—and carrying out experiments—which could eventually change the historical trends of educational expenditures. Recently, for example, the findings of various investigations that have been published indicate the possibility of teaching staff being used in a more intensive manner, without it entailing "deterioration" in the quality of education. In this way, it would be possible to absorb the increases that may take place in the wages of the teachers. Other studies have demonstrated that the marginal cost of education that is extended to the communities with a low population density, can be lower than the existing cost, since technologies are available that can produce more efficient results than those widely used up to now.

With respect to the behavior of the factors external to the educational system, one important hypothesis about the assumption that deviations from the model used here would continue behaving as they did in 1970 was established. This hypothesis states that the educational demand will behave in accordance with the educational requirements of the different occupations in the relatively more developed countries in 1970, since the estimates of the demand for education were based on a cross-section analysis made in that year. The comments that have been made earlier lead us to question the plausibility of this assumption. It is therefore necessary to examine the implications of the non-fulfillment of this assumption. If we compare the estimates obtained here with others that do not assume that this phenomenon will continue behaving in the same way as it did in the past, we can obtain an indication of the impact on the demand for education in the future of a possible rise in the educational levels required for performing different jobs.

In 1977, the International Office of Education (of UNESCO) presented a report containing the projections of school enrollments that were prepared for the different regions of the world, in accordance with the Education Projections Program of the Office of Statistics of UNESCO. These estimates are based on calculations of logarithmic functions adjusted to the educational trends in each country. The growth rates of the enrollment for the three educational levels in Latin America maintain the following relationship with those that have been obtained in this study:

Educational level	Rates projected by UNESCO	Maximum rates resulting from this study
Primary		
1970-75	3.9%	
1975-80	3.5%	2.7%
1980-85	3.5%	2.8%
Secondary		
1970-75	9.3%	
1975-80	6.8%	8.2%
1980-85	4.6%	2.1%
Higher		
1970-75	16.1%	
1975-80	10.2%	9.1%
1980-85	5.6%	3.9%

If we apply the rates projected by UNESCO to the enrollment figures for 1970 that were used for the 18 countries considered here (which were obtained from the annual reports of UNESCO), we can deduce the following relationships between the projections made in our study and those that were made for 1985.

Educational level	UNESCO projection (thousands of students)	Projections obtained from this study
Primary	69,323.9	61,471.7
Secondary	26,785.6	24,868.1
Higher	6,992.5	4,627.2

From these figures it is clear that, if the educational levels required for performing different jobs continue changing in the future, there will have to be a more rapid increase in the enrollment of higher education than that predicted here. The enrollment ratio at this level could reach 15.2% in 1985 (instead of 10.6% that was projected as the maximum) according to this projection. The financial implications of this difference may be that the proportions of the GNP's generally allocated to the financing of education will increase by 0.15 percentage points (which is equivalent to 50% of the 0.30 points that have been projected as the porportion of the GNP that would be allocated to the financing of higher education).

D. SUMMARY AND CONCLUSIONS

1. The relationship between *per capita* national product and the incidence of public expenditure on education is not as strong as would be expected *a priori*, for several reasons: the participation of the private sector in the financing of education varies significantly among the countries; the structure of unit costs is not determined in each country by its average productivity level; and the relationship between the schooling of the labor force and *per capita* productivity is more complex than the authors of the "manpower approach" assumed, since, in practice, the schooling of the labor force also determines the requirements for performing various jobs.

2. Nevertheless, the demand for education—expressed in real terms—is correlated with the *per capita* income (of each country) and with the income of each family unit (within the countries). This means that the members of the various social strata acquire as much education as their living conditions permit. Over time the imbalance between the number of school leavers and the number of those who enter the labor force, on appropriate conditions, causes an increase in the schooling required—in the labor market—for performing the jobs available. This phenomenon in turn raises the educational aspirations of the different social groups and, through them, increases the demand for education in the respective countries.

3. This means that two groups of factors can be distinguished among the determinants of the demand for education. The first group consists mainly of the phenomena related to population growth and trends in levels of living. (These phenomena are actually beyond the control of educational planners.) The second comprises phenomena related to the existing imbalance between the supply of labor processed by the school systems, and the existing demand for labor in the market, as well as the trends of the operating costs of the school systems. These factors are endogenous to the planning process. The statistical model developed in the study is composed exclusively of factors exogenous to the planning of educational development.

4. Accordingly, the forecast is that the average gross enrollment coefficients will remain in 1990 at around 90% in primary education, 50% in secondary education, and about 11% in higher education. The geometric enrollment growth rates reflect interesting trends. Thus, those for primary education, which have been increasing at average rates exceeding 4% annually, will continue to grow at rates close to 3%; those of secondary education, which increased from 10.8% to 12.6% between 1964-67 and 1970-73, will increase by 8% until 1980 and then by 2% annually. In addition, the enrollment growth rates in higher education—which had in-

creased from 9.4% to 18% between the above-mentioned periods—will fall to 9.1% in 1980, to 4% between 1980 and 1985, and to 3.4% between 1985 and 1990 (all these figures are weighted averages).

The enrollment coefficients for primary education must be considered to reflect "gross ratios"; therefore they have not been adjusted for the proportion of enrolled students whose ages exceed those that in theory would correspond to that educational level. Now, leaving aside a few countries, the projected coefficients are not sufficiently high to be able to absorb the entire population cohort between 6 and 12 years of age. This means that the problems at present affecting rural education in the region will probably persist. Therefore, it will be necessary to continue to develop educational methods and procedures (for formal and non-formal) education which, being aimed at accelerating the effective demand for formal education—by improving retention rates—will make it possible to move ahead in the coming years to a lesser imbalance between urban and rural schools in Latin America.

5. The foregoing projections assume that the countries covered by the study will continue to maintain the same order of priorities as have been accorded to the primary, secondary and higher levels in the past. They are also based on the assumption that the unit costs of education, in real terms, will remain at the same level as in 1970. Therefore, any change in these assumptions, as well as any future change that may occur in the relationship between the various occupational categories and the education of the labor force, would obviously affect the projections just mentioned.

6. The projections of public expenditure on education indicate that, between 1973 and 1980, it will increase at the same rate as between 1960 and 1973 (6.5% annually). Beginning in 1980, the growth rate of this expenditure will fall to 2.6%. However, in some countries (e.g., Brazil, Chile, Dominican Republic, El Salvador, Guatemala, Mexico and Paraguay), the projected increase in 1973–80 will be more rapid than in 1960–73.

7. To sum up, according to the model used here, the increase in resources that will be necessary to finance education in Latin America in the years ahead, will tend to be slower than in the past. Nevertheless, should the planning processes be unable to prevent the demand for labor from growing at slower rates than the economically active population, the educational aspirations of the various social groups will continue to increase, which could generate pressure on educational costs to a greater extent than envisaged here. This also applies to the increases that may occur in educational costs, although they could be prevented by the use of more efficient technologies. (As will be recalled, these phenomena were considered endogenous variables in educational planning, precisely because their behavior depends on the decisions of economic and social planners.) Therefore, it is necessary to emphasize that these additional pressures would be derived neither from the growth of the school-age population, the urbanization processes, nor the expected improvements in the standard of living of the population of the different countries. Since these pressures could impede progress in satisfying the effective demand for education at the primary level, it will be necessary, in any event, to adopt policies that favor the creation of the jobs demanded by the growth of the economically active population in the different countries, as well as the use of efficient educational technologies.

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Table IV-1. Latin America: Rank Correlations Between Per Capita GNP, Government Expenditure on Education, and Gross Enrollment Ratios, 1970

Country	Per Capita GNP Rank	Government educational expenditure as % of GNP Rank	Enrollment Ratios Primary Rank	Enrollment Ratios Secondary Rank	Enrollment Ratios Higher Rank
Argentina	1	17	2	3	1
Bolivia	18	3	11	9	7
Brazil	11	9	16	5	13
Chile	3	5	1	8	6
Colombia	13	18	14	11	14
Costa Rica	7	1	5	10	5
Dominican Republic	10	12	10	13	10
Ecuador	16	6	9	7	9
El Salvador	14	13	13	14	17
Guatemala	12	16	18	18	16
Honduras	15	10	15	17	15
Mexico	6	11	8	12	11
Nicaragua	9	15	17	15	12
Panama	5	2	7	2	8
Paraguay	17	14	6	16	18
Peru	8	7	4	4	4
Uruguay	4	8	3	1	2
Venezuela	2	4	12	6	3
Rank correlations					
With per capita GNP		0.178*	0.505**	0.575**	0.713**
With government educational expenditure/GNP			0.352*	0.474**	0.503**

*Not significant **Significant at .05 level

Table IV-2. Latin America: Relationship Between Public Current Expenditure on Education per Student Enrolled in Public Schools and Per Capita GNP, 1970

Country	Primary Direct expenditure	Primary Total expenditure*	Secondary Direct expenditure	Secondary Total expenditure*	Higher Direct expenditure	Higher Total expenditure*
Argentina	—	0.08	—	0.30	0.38	0.47
Bolivia	0.21	0.26	0.39	0.48	1.88	2.28
Brazil	0.12	0.14	0.21	0.24	3.7	4.2
Chile	0.07	0.08	0.19	0.21	2.3	2.6
Colombia	—	0.10	0.24	0.31	1.3	1.6
Costa Rica	0.14	0.16	0.33	0.39	0.6	0.7
Dominican Republic	0.06	0.08	0.2	0.28	1.2	1.5
Ecuador	0.03	0.03	0.58	0.6	0.6	0.62
El Salvador	0.10	0.11	0.31	0.33	2.7	2.9
Guatemala	0.12	0.14	0.4	0.5	0.9	1.0
Honduras	0.14	0.16	1.3	1.4	2.1	2.3
Mexico	0.08	0.10	0.28	0.33	0.39	0.50
Nicaragua	0.09	0.11	0.22	0.26	0.64	0.73
Panama	0.12	0.16	0.30	0.36	0.5	0.68
Paraguay	0.08	0.08	0.25	0.27	1.2	1.3
Peru	0.11	0.12	0.24	0.27	0.79	0.86
Uruguay	0.17	0.18	0.22	0.23	0.79	0.83
Venezuela	0.11	0.13	0.26	0.30	1.36	1.57
Weighted average	**0.09**	**0.11**	**0.24**	**0.29**	**1.46**	**2.57**

*The portion for other expenditures has been distributed among the various educational levels.

Table IV-3. Latin America: Minimum Estimate of Enrollment in Primary, Secondary and Higher Education, 1970–1990
(Thousands of students)

	Primary				Secondary				Higher			
Country	1970	1980	1985	1990	1970	1980	1985	1990	1970	1980	1985	1990
Argentina	3,385.8	3,385.8	3,517.2	3,626.2	974.8	1,075.1	1,09[illegible].1	1,142.5	274.6	272.4	294.0	320.6
Bolivia	679.1	845.3	944.6	1,044.5	101.9	256.7	29[illegible].7	330.7	26.5	34.2	41.9	49.5
Brazil	12,812.0	15,975.5	18,577.2	20,544.5	4,083.6	8,267.5	9,273.1	10,330.0	430.5	537.4	645.8	791.8
Chile	2,039.2	2,088.9	2,229.4	2,484.6	302.1	559.2	568.7	594.6	78.4	123.4	150.0	164.3
Colombia	3,286.0	3,317.9	3,598.3	4,137.7	739.5	1,292.9	1,306.0	1,343.3	85.6	118.3	143.8	156.0
Costa Rica	349.4	378.4	388.5	433.5	61.1	139.8	142.6	139.7	15.5	18.3	23.0	26.0
Dominican Republic	773.4	1,085.0	1,282.3	1,510.9	113.0	214.6	254.4	295.8	23.5	22.3	28.2	37.0
Ecuador	1,016.2	1,384.7	1,632.6	1,949.0	219.4	539.3	628.6	740.9	38.7	37.0	46.6	57.7
El Salvador	531.3	714.0	825.1	962.5	88.3	160.3	189.6	237.4	9.5	7.2	8.7	10.6
Guatemala	505.7	524.8	605.0	676.3	75.5	119.7	137.0	162.4	15.6	14.1	17.4	20.7
Honduras	384.7	548.9	667.8	789.4	39.8	72.3	87.6	104.6	4.8	6.8	9.0	11.8
Mexico	9,248.3	12,547.0	14,920.7	17,710.5	1,584.3	2,798.1	3,227.3	3,703.4	247.6	393.8	512.9	657.2
Nicaragua	285.3	338.1	396.0	451.6	51.4	169.0	194.5	222.7	9.4	9.2	12.1	16.5
Panama	255.3	283.8	300.5	310.5	78.5	151.9	171.1	183.3	8.1	11.3	13.0	14.8
Paraguay	424.2	540.9	615.9	705.4	55.8	84.9	98.8	111.9	8.2	8.9	10.4	12.2
Peru	2,488.4	3,316.0	3,763.0	4,314.0	660.1	1,206.7	1,378.8	1,521.5	124.7	100.4	122.6	144.8
Uruguay	354.1	354.1	361.1	372.2	174.3	176.9	179.1	186.1	25.0	25.0	25.2	25.2
Venezuela	1,769.7	2,207.1	2,512.1	2,980.6	465.9	1,149.0	1,255.0	1,414.0	100.8	141.1	167.7	180.8
Total:	**40,988.4**	**[illegible]836.2**	**57,137.3**	**64,983.9**	**9,864.3**	**18,433.9**	**20,482.1**	**22,764.8**	**1,527.8**	**1,881.1**	**2,272.3**	**2,897.5**

Table IV-4. Latin America: Maximum Estimate of Enrollment in Primary, Secondary and Higher Education, 1970–1990
(Thousands of students)

Country	Primary				Secondary				Higher			
	1970	1980	1985	1990	1970	1980	1985	1990	1970	1980	1985	1990
Argentina	3,385.8	3,694.4	3,959.7	4,082.4	974.8	1,216.6	1,240.1	1,292.6	274.6	362.8	392.7	426.6
Bolivia	679.1	882.9	987.4	1,091.0	101.9	325.9	372.8	419.7	26.5	35.4	42.5	50.3
Brazil	12,812.0	16,474.6	19,151.2	21,186.4	4,083.6	9,674.3	10,830.6	12,077.6	430.5	1,356.7	1,630.6	1,999.4
Chile	2,039.2	2,164.5	2,308.6	2,572.9	302.1	616.4	626.8	655.4	78.4	192.6	233.6	254.7
Colombia	3,286.0	3,761.3	4,080.1	4,687.9	739.5	1,779.4	1,793.5	1,844.8	85.6	307.8	374.2	405.4
Costa Rica	349.4	418.9	429.8	479.6	61.1	175.9	179.3	175.6	15.5	29.1	36.4	41.2
Dominican Republic	773.4	1,093.9	1,291.6	1,522.7	113.0	281.1	333.3	387.6	23.5	43.0	54.4	71.4
Ecuador	1,016.5	1,407.6	1,661.9	1,983.0	219.4	507.6	709.4	835.4	38.7	63.3	80.4	99.0
El Salvador	531.3	847.4	979.7	1,142.4	88.3	182.2	215.6	269.9	9.5	45.6	55.4	67.1
Guatemala	505.7	723.4	833.9	933.4	75.5	226.7	259.5	307.6	15.6	68.5	84.5	101.0
Honduras	384.7	574.0	689.0	804.5	39.8	122.5	148.4	177.3	4.8	24.4	32.4	42.4
Mexico	9,248.3	14,110.7	16,767.3	19,924.3	1,584.3	3,993.4	4,595.1	5,272.9	247.6	804.1	1,046.6	1,341.0
Nicaragua	285.3	389.0	455.7	520.4	51.4	169.9	195.8	224.2	9.4	19.8	26.2	35.7
Panama	255.3	330.6	350.1	361.3	78.5	155.4	174.9	187.6	8.1	19.3	22.3	25.2
Paraguay	424.2	546.8	622.9	713.1	55.8	95.8	111.5	126.3	8.2	25.6	29.8	35.2
Peru	2,488.4	3,473.8	3,942.9	4,521.2	660.1	1,320.0	1,505.8	1,664.7	124.7	171.2	209.6	209.6
Uruguay	354.1	378.2	389.3	401.3	174.3	189.9	192.1	199.8	25.0	33.1	35.0	35.7
Venezuela	1,769.7	2,156.9	2,570.6	3,050.0	465.9	1,265.6	1,383.6	1,560.1	100.8	202.6	240.6	259.4
Total:	**40,588.4**	**53,428.9**	**61,471.7**	**69,977.8**	**9,869.3**	**22,398.6**	**24,868.1**	**27,679.1**	**1,527.0**	**3,804.9**	**4,627.2**	**5,500.3**

Table IV-5. Latin America: Minimum Estimate of Total Expenditure by Level of Education, 1980, 1985, 1990
(Millions of 1970 US$)

Country	1980				1985				1990			
	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.
Argentina	295.2	318.7	133.8	747.7	310.6	323.9	146.1	780.6	318.0	338.5	159.6	816.1
Bolivia	44.0	25.5	15.8	85.3	49.2	28.7	19.4	97.3	54.5	32.2	22.9	109.6
Brazil	817.3	779.4	827.0	2,423.7	960.1	840.4	996.6	2,797.1	1,050.2	934.6	1,222.6	3,207.4
Chile	138.2	101.2	270.8	510.2	148.6	100.4	329.2	578.2	166.7	105.4	359.4	631.9
Colombia	105.0	132.5	61.3	298.8	117.2	127.1	74.8	319.1	137.6	131.3	80.2	349.1
Costa Rica	32.5	30.2	6.9	69.6	33.2	29.0	9.0	71.2	37.8	28.3	9.9	76.0
Dominican Republic	35.6	25.4	13.2	74.2	42.3	29.5	17.0	88.8	49.7	34.3	22.4	106.4
Ecuador	39.2	84.3	5.9	129.4	46.4	96.9	7.7	151.0	55.5	114.4	9.5	179.4
El Salvador	25.1	16.5	6.2	47.8	29.1	19.3	7.6	56.0	34.0	24.3	9.2	67.5
Guatemala	26.1	22.8	5.3	54.2	31.2	30.0	6.7	67.9	34.5	30.9	7.9	73.3
Honduras	23.3	26.9	8.4	58.6	28.3	32.5	5.5	66.3	32.3	[illegible]	[illegible]	78.3
Mexico	823.7	622.2	136.7	1,582.6	986.6	708.4	174.4	1,869.4	1,170.8	812.3	222.8	2,205.9
Nicaragua	16.6	20.4	2.9	39.9	20.1	22.4	4.1	46.6	22.6	25.6	5.6	53.8
Panama	33.9	44.2	5.6	83.7	38.1	48.5	6.4	93.0	38.2	51.5	7.4	97.1
Paraguay	11.2	5.7	2.81	19.71	12.8	6.5	3.34	22.64	14.7	7.4	4.0	26.1
Peru	188.3	150.9	38.6	377.8	213.3	168.5	48.7	430.5	245.1	184.6	57.2	486.9
Uruguay	0	36.8	17.3	54.1	54.4	37.0	17.42	108.82	56.2	38.7	17.4	112.3
Venezuela	278.5	341.0	211.1	830.6	327.9	357.7	251.2	936.8	390.3	405.3	268.7	1,064.3
Total	**2,933.7**	**2,784.6**	**1,769.6**	**7,487.9**	**3,434.4**	**3,006.7**	**2,125.16**	**8,566.26**	**3,908.7**	**3,338.52**	**2,494.2**	**9,741.4**

Table IV-6. Latin America: Maximum Estimate of Total Expenditures by Level of Education, 1980, 1985, 1990
(Millions of 1970 US$)

	1980				1985				1990			
Country	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.	Primary Exp.	Secondary Exp.	Higher Exp.	Total Exp.
Argentina	324.7	362.9	181.8	869.4	349.8	366.5	195.3	911.6	358.1	383.0	212.3	953.4
Bolivia	46.1	32.6	16.3	95.0	51.5	36.4	21.3	109.2	56.9	40.9	25.0	122.8
Brazil	845.4	920.8	2,107.8	3,734.0	989.7	981.1	2,516.3	4,487.1	1,083.1	1,093.0	3,087.4	5,263.5
Chile	143.5	108.9	423.8	676.2	154.0	110.6	512.6	777.2	172.7	105.4	557.7	835.8
Colombia	121.9	185.9	163.7	471.5	133.0	174.5	194.7	502.2	155.9	180.4	208.5	544.8
Costa Rica	36.9	38.3	11.6	86.8	36.9	36.5	14.4	87.8	42.6	35.5	15.3	93.4
Dominican Republic	35.9	33.6	26.0	95.5	42.5	38.7	32.9	114.1	50.1	44.9	43.3	138.3
Ecuador	39.8	95.3	10.4	145.5	47.2	109.4	13.3	169.9	56.4	128.9	16.4	201.7
El Salvador	30.3	19.0	40.2	89.5	34.6	21.9	48.3	104.8	40.4	27.7	58.5	126.6
Guatemala	37.5	44.3	27.4	109.2	43.0	49.1	32.7	124.8	47.7	58.6	38.9	145.2
Honduras	24.2	45.9	14.9	85.0	29.1	55.3	19.6	104.0	33.8	65.9	27.6	127.3
Mexico	936.2	899.5	280.9	2,116.6	1,108.5	1,008.3	355.9	2,472.7	1,317.3	1,156.7	454.6	2,928.6
Nicaragua	18.8	20.5	6.6	45.9	22.1	22.6	8.8	53.5	25.0	28.7	12.0	65.7
Panama	39.9	45.3	10.1	95.3	41.7	49.6	11.1	102.4	42.7	52.7	12.5	107.9
Paraguay	11.3	6.4	8.4	26.1	13.0	7.5	9.6	30.1	14.9	8.4	11.4	34.7
Peru	198.0	165.9	67.5	431.4	219.3	183.9	83.3	486.5	256.9	202.0	80.7	539.6
Uruguay	57.2	68.06	23.3	148.56	58.8	68.9	24.4	152.1	60.6	71.8	24.8	157.2
Venezuela	285.5	376.9	305.9	968.3	335.1	394.5	360.4	1,090.0	399.4	447.1	385.6	1,232.1
Total	**3,233.1**	**3,470.06**	**3,726.6**	**10,429.76**	**3,709.8**	**3,715.3**	**4,454.9**	**11,880.0**	**4,214.5**	**4,131.6**	**5,272.6**	**13,618.6**

Table IV-7. Latin America: Projections of the Relationship Between Expenditure on Education and Gross National Product. Minimum Estimate of Expenditure/GNP and Rapid GNP Growth (%), 1980–1990

Country	1980				1985				1990			
	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP
Argentina	0.7	0.8	0.3	1.8	0.6	0.6	0.3	1.5	0.5	0.5	0.2	1.2
Bolivia	2.5	1.5	0.8	4.8	2.1	1.2	0.8	4.1	1.7	1.0	0.7	3.4
Brazil	0.8	0.8	0.8	2.4	0.6	0.5	0.6	1.7	0.4	0.3	0.4	1.1
Chile	1.2	0.9	2.4	4.5	1.0	0.7	2.3	4.0	0.9	0.5	1.9	3.3
Colombia	0.8	1.0	0.5	2.3	0.7	0.7	0.4	1.8	0.5	0.5	0.3	1.3
Costa Rica	1.8	1.6	0.4	3.8	1.2	1.0	0.3	2.5	0.9	0.7	0.2	1.8
Dominican Republic	0.8	0.6	0.3	1.7	0.5	0.4	0.2	1.2	0.5	0.3	0.2	1.0
Ecuador	1.3	2.7	0.2	4.2	1.1	2.2	0.2	3.5	0.9	1.9	0.1	2.9
El Salvador	1.4	0.9	0.3	2.6	1.1	0.8	0.3	2.2	1.0	0.7	0.3	2.0
Guatemala	0.7	0.6	0.1	1.4	0.6	0.6	0.1	1.3	0.5	0.4	0.1	1.0
Honduras	2.1	2.4	0.3	4.8	1.9	2.2	0.4	4.5	1.7	2.1	0.4	4.2
Mexico	1.5	1.1	0.2	2.8	1.4	1.0	0.2	2.6	1.3	0.9	0.2	2.4
Nicaragua	0.9	1.2	0.2	2.3	0.7	0.8	0.1	1.6	0.5	0.6	0.1	1.2
Panama	1.6	2.1	0.3	4.0	1.2	1.6	0.2	3.0	0.8	1.1	0.2	2.1
Paraguay	1.0	0.5	0.3	1.8	0.9	0.4	0.2	1.5	0.7	0.4	0.2	1.3
Peru	1.7	1.3	0.3	3.3	1.4	1.1	0.3	2.8	1.2	0.9	0.3	2.4
Uruguay	2.0	1.4	0.6	4.0	1.8	1.3	0.6	3.7	1.7	1.2	0.5	3.4
Venezuela	1.6	1.9	1.2	4.7	1.3	1.4	1.0	3.7	1.1	1.1	0.7	2.9
Weighted average				2.7				2.1				1.5

Table IV-8. Latin America: Projections of the Relationship Between Expenditure on Education and Gross National Product. Minimum Estimate of Expenditure/GNP and Slow GNP Growth (%), 1980–1990

Country	1980				1985				1990			
	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP
Argentina	0.8	0.9	0.5	2.2	0.7	0.8	0.4	1.9	0.6	0.7	0.4	1.7
Bolivia	3.0	2.1	1.1	6.2	2.8	1.9	1.1	5.8	2.4	1.7	1.1	5.2
Brazil	1.2	1.3	3.1	5.6	1.1	1.1	2.8	5.1	1.0	1.0	2.9	4.9
Chile	1.4	1.1	4.2	6.7	1.3	1.0	4.5	6.8	1.3	0.9	4.3	6.5
Colombia	1.1	1.7	1.5	4.3	[illegible]	1.2	1.4	3.5	0.9	1.0	1.2	3.1
Costa Rica	2.5	2.7	0.8	6.1	[illegible]	2.2	0.8	5.2	2.1	1.7	0.7	4.5
Dominican Republic	1.3	1.2	0.9	3.4	1.3	1.2	1.0	3.5	1.4	1.2	1.2	3.8
Ecuador	1.5	3.6	0.4	5.5	1.5	3.4	0.4	5.3	1.4	3.3	0.4	5.1
El Salvador	1.9	1.2	2.5	5.6	1.7	1.1	2.4	5.2	1.6	1.1	2.3	5.0
Guatemala	1.1	1.3	1.9	4.3	1.0	1.2	1.9	4.1	0.9	1.1	0.7	2.7
Honduras	2.4	4.6	1.5	8.5	2.5	4.6	1.7	9.0	2.5	4.8	[illegible]	9.3
Mexico	1.9	1.8	0.6	4.3	1.7	1.5	0.5	3.7	1.7	1.5	0.6	3.8
Nicaragua	1.4	1.5	0.5	3.4	1.3	1.3	0.5	3.1	1.1	1.3	0.5	2.9
Panama	2.2	2.5	0.5	5.2	1.7	2.0	0.4	4.1	1.3	1.6	0.4	3.3
Paraguay	1.2	0.7	0.9	2.8	1.1	0.6	0.8	2.5	1.0	0.6	0.8	2.4
Peru	2.0	1.7	0.7	4.4	1.8	1.5	0.7	4.0	1.7	1.3	0.5	3.5
Uruguay	[illegible]	3.1	1.1	6.8	2.7	3.2	1.1	7.0	2.9	3.5	1.2	7.6
Venezuela	2.0	2.6	2.1	6.7	1.9	2.0	2.0	5.9	1.8	2.0	1.7	5.5
Weighted average				4.3				3.9				3.6

Table IV-9. Latin America: Projection of Public Expenditure by Level of Education: Minimum Estimate, 1980, 1985, 1990
(Millions of 1970 US$)

Country	Primary			Secondary			Higher			Total		
	1980	1985	1990	1980	1985	1990	1980	1985	1990	1980	1985	1990
Argentina	248.0	260.9	267.1	213.5	217.0	226.8	112.4	122.7	134.1	573.9	600.6	628.0
Bolivia	34.3	38.4	42.5	15.4	18.4	21.0	15.3	18.8	22.2	66.0	75.6	85.7
Brazil	735.6	864.1	945.2	436.4	470.6	523.4	367.2	442.5	542.8	1,539.2	1,877.5	2,011.4
Chile	106.4	114.4	128.3	83.0	82.3	86.4	184.1	223.8	244.7	373.5	422.5	459.4
Colombia	91.3	102.0	119.7	62.3	59.7	61.7	31.9	38.9	41.7	185.5	200.6	223.1
Costa Rica	31.2	31.9	36.3	26.0	25.0	24.3	6.9	9.0	9.9	64.1	65.9	70.5
Dominican Republic	31.7	37.6	44.2	19.0	21.8	25.4	10.2	13.1	17.2	60.9	72.5	86.8
Ecuador	32.5	38.5	46.1	52.0	59.7	70.5	4.8	6.2	7.7	89.3	104.4	124.3
El Salvador	23.8	27.6	32.3	6.6	7.7	9.7	4.8	5.8	7.1	35.2	41.1	49.1
Guatemala	21.9	28.2	29.0	11.4	15.0	15.4	4.3	5.5	6.5	37.6	46.7	50.9
Honduras	21.9	26.6	30.4	6.1	7.3	8.7	3.8	5.2	6.7	31.8	39.1	45.8
Mexico	780.0	934.3	1,108.7	444.9	506.5	580.8	119.6	152.6	194.9	1,344.5	1,583.4	1,884.4
Nicaragua	14.1	17.1	19.2	12.2	13.4	15.4	2.5	2.7	3.6	28.8	33.2	38.2
Panama	32.2	36.2	36.3	34.5	37.8	40.2	5.4	6.1	7.1	72.1	80.1	83.6
Paraguay	9.7	11.1	12.8	2.8	3.2	3.7	2.1	2.5	3.0	14.6	16.8	19.5
Peru	163.8	185.6	213.2	128.3	143.2	156.9	27.8	35.1	41.2	319.9	363.9	411.3
Uruguay	41.0	42.0	43.3	30.4	30.6	32.0	17.3	17.4	17.4	88.7	90.0	92.7
Venezuela	245.1	288.5	343.5	276.2	289.7	328.3	185.8	221.1	236.5	707.1	799.3	908.3
Total	**2,664.5**	**3,083.0**	**3,498.1**	**1,862.0**	**2,008.9**	**2,230.6**	**1,106.2**	**1,329.0**	**1,544.3**	**5,632.7**	**6,420.9**	**7,273.8**

Table IV-10. Latin America: Projection of Public Expenditure by Level of Education: Maximum Estimate, 1980, 1985, 1990
(Millions of 1970 US$)

Country	Primary			Secondary			Higher			Total		
	1980	1985	1990	1980	1985	1990	1980	1985	1990	1980	1985	1990
Argentina	272.7	293.8	300.8	243.1	245.6	256.6	152.7	164.0	178.3	668.5	703.4	735.7
Bolivia	35.9	40.2	44.4	20.9	23.3	26.2	15.8	20.7	24.3	72.6	84.2	94.9
Brazil	760.8	880.7	974.8	515.6	549.4	612.1	935.9	1,117.2	1,370.8	2,212.3	2,557.3	2,957.7
Chile	110.5	118.6	133.0	89.3	91.0	95.2	288.1	348.6	379.2	487.9	558.2	607.4
Colombia	106.0	115.7	135.6	87.4	82.0	84.8	85.1	101.2	108.4	278.5	298.9	328.8
Costa Rica	35.4	35.4	41.0	32.9	31.4	30.5	11.6	14.4	15.3	79.9	81.2	86.8
Dominican Republic	31.9	37.8	44.6	25.0	28.6	33.2	20.0	25.3	33.3	76.9	91.7	111.1
Ecuador	33.0	39.2	46.8	58.7	67.4	79.5	8.4	10.8	13.3	100.1	117.4	139.6
El Salvador	28.8	33.0	38.4	7.6	8.8	11.1	30.9	37.2	45.0	67.3	79.0	94.5
Guatemala	31.5	36.1	40.1	22.1	24.6	29.3	22.5	26.8	32.0	76.1	87.5	101.4
Honduras	22.7	27.3	31.8	10.3	12.4	14.8	14.0	18.4	25.9	47.0	58.1	72.5
Mexico	886.6	1,049.7	1,247.5	643.1	720.9	827.0	245.8	311.4	398.0	1,775.5	2,082.0	2,472.5
Nicaragua	16.0	19.0	21.2	12.3	12.6	17.2	4.3	5.7	7.8	32.6	36.3	46.2
Panama	37.9	39.6	40.6	35.3	39.0	41.1	9.7	11.0	12.0	82.9	89.6	93.7
Paraguay	9.8	11.3	13.0	3.2	3.7	4.2	6.4	7.3	8.7	19.4	22.3	25.9
Peru	172.2	190.8	223.5	141.0	156.3	171.7	48.6	60.0	58.1	361.8	407.1	453.3
Uruguay	44.0	45.3	46.7	56.2	56.9	59.3	23.3	24.0	24.8	123.5	126.2	130.8
Venezuela	251.2	295.0	351.5	305.3	319.5	362.1	269.2	317.1	339.3	825.7	931.6	1,052.9
Total	**2,886.9**	**3,318.5**	**3,775.3**	**2,309.3**	**2,474.4**	**2,755.9**	**2,192.3**	**2,621.1**	**3,074.5**	**7,388.5**	**8,414.0**	**9,605.7**

Table IV-11. Latin America: Geometric Growth Rates of Public Expenditure on Education: Historical Data, Minimum and Maximum Estimates, 1970–1990

Country	Historical data		Maximum estimate			Minimum estimate		
	1960–73	1965–70	1973–80	1980–85	1985–90	1973–80	1980–85	1985–90
Argentina	4.1	−5.21	.28	1.0	.9	−1.9	0.9	0.9
Bolivia	11.5	20.28	8.4	3.0	2.4	7.0	2.7	2.5
Brazil	6.7	10.45	7.1	2.9	2.9	1.9	4.0	1.4
Chile	6.1	7.43	7.3	2.7	1.7	3.4	2.5	1.7
Colombia	11.9	9.39	7.6	1.4	1.9	1.7	1.6	2.1
Costa Rica	9.6	8.52	3.5	0.3	1.3	0.3	0.5	1.3
Dominican Republic	6.4	3.60	7.9	3.5	3.8	4.6	3.5	3.6
Ecuador	9.2	13.66	7.5	3.2	3.5	5.9	3.1	3.5
El Salvador	3.6	3.92	14.6	3.2	3.6	5.3	3.1	3.5
Guatemala	6.2	5.13	10.5	2.8	2.9	0.4	4.3	1.7
Honduras	8.1	7.50	6.6	4.2	4.4	1.1	4.1	3.2
Mexico	7.2	17.50	9.5	3.2	3.4	5.5	3.4	3.3
Nicaragua	9.1	7.90	6.8	3.2	3.7	5.1	2.8	2.8
Panama	9.6	13.20	3.3	1.5	0.9	4.3	2.1	0.8
Paraguay	4.0	7.20	6.7	2.8	3.0	2.7	2.8	3.0
Peru	7.0	−2.00	1.6	2.3	2.1	−0.1	2.6	2.4
Uruguay	—	1.50	4.7	0.4	0.7	−0.06	0.2	0.6
Venezuela	8.6	9.30	7.3	2.4	2.4	5.1	2.4	2.5
Weighted average	**6.5**	**7.40**	**6.5**	**2.8**	**2.8**	**2.7**	**2.8**	**2.5**

Table IV-12. Latin America: Projections of the Relationship Between Public Expenditure on Education and Gross National Product. Minimum Estimate of Expenditure/GNP and Rapid GNP Growth (%), 1980–1990

Country	1980				1985				1990			
	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP	Primary Exp/GNP	Secondary Exp/GNP	Higher Exp/GNP	Total Exp/GNP
Argentina	0.6	0.5	0.3	1.4	0.5	0.4	0.2	1.1	0.4	0.3	0.2	0.9
Bolivia	2.0	0.9	0.9	3.8	1.6	0.8	0.8	3.2	1.3	0.7	0.7	2.7
Brazil	0.7	0.4	0.4	1.5	0.5	0.3	0.3	1.1	0.3	0.2	0.2	0.7
Chile	0.9	0.7	1.6	3.2	0.8	0.6	1.5	2.9	0.7	0.5	1.3	2.5
Colombia	0.7	0.5	0.2	1.4	0.6	0.3	0.2	1.1	0.5	0.2	0.2	0.9
Costa Rica	1.7	1.4	0.4	3.5	1.1	0.9	0.3	2.3	0.8	0.8	0.2	1.8
Dominican Republic	0.7	0.4	0.2	1.3	0.5	0.3	0.2	1.0	0.4	0.2	0.1	0.7
Ecuador	1.0	1.7	0.1	2.8	0.9	1.4	0.1	2.4	0.7	1.1	0.1	1.9
El Salvador	1.3	0.4	0.3	2.0	1.1	0.3	0.2	1.6	0.9	0.3	0.2	1.4
Guatemala	0.6	0.3	0.1	1.0	0.5	0.3	0.1	0.9	0.4	0.2	0.1	0.7
Honduras	1.9	0.5	0.3	2.7	1.8	0.5	0.3	2.6	1.6	0.5	0.3	2.4
Mexico	1.4	0.8	0.2	2.4	1.3	0.7	0.2	2.2	1.2	0.6	0.2	2.0
Nicaragua	0.8	0.7	0.1	1.6	0.6	0.5	0.1	1.2	0.4	0.3	0.1	0.8
Panama	1.5	1.7	0.2	3.4	1.2	1.2	0.2	2.6	0.8	0.9	0.1	1.8
Paraguay	0.9	0.3	0.2	1.4	0.8	0.2	0.2	1.2	0.6	0.2	0.1	0.9
Peru	1.4	1.1	0.2	2.7	1.2	1.0	0.2	2.4	1.0	0.7	0.2	1.9
Uruguay	1.5	1.1	0.6	3.2	1.4	1.0	0.6	3.0	1.3	1.0	0.5	2.8
Venezuela	1.4	1.6	1.0	4.0	1.1	1.1	0.9	3.1	1.0	0.9	0.6	2.5
Weighted average	**1.0**	**0.7**	**0.4**	**2.1**	**0.8**	**0.5**	**0.3**	**1.6**	**0.6**	**0.4**	**0.3**	**1.3**

Table IV-13. Latin America: Projections of the Relationship Between Public Expenditure on Education and Gross National Product. Maximum Estimate of Expenditure/GNP and Slow GNP Growth (%), 1980–90

Country	1980 Primary Exp/GNP	1980 Secondary Exp/GNP	1980 Higher Exp/GNP	1980 Total Exp/GNP	1985 Primary Exp/GNP	1985 Secondary Exp/GNP	1985 Higher Exp/GNP	1985 Total Exp/GNP	1990 Primary Exp/GNP	1990 Secondary Exp/GNP	1990 Higher Exp/GNP	1990 Total Exp/GNP
Argentina	0.7	0.6	0.4	1.7	0.6	0.5	0.3	1.4	0.5	0.4	0.3	1.2
Bolivia	2.3	1.3	1.0	4.6	2.1	1.2	1.1	4.4	1.9	1.1	1.0	4.0
Brazil	1.1	0.7	1.3	3.1	1.0	0.6	1.3	2.9	0.9	0.6	1.3	2.8
Chile	1.1	0.9	2.9	4.9	1.0	0.8	3.1	4.9	1.0	0.7	2.9	4.6
Colombia	0.9	0.8	0.8	2.5	0.8	0.6	0.7	2.1	0.8	0.5	0.6	1.9
Costa Rica	2.5	2.3	0.8	5.6	2.1	1.9	0.8	4.8	2.0	1.5	0.7	4.2
Dominican Republic	1.1	0.9	0.7	2.7	1.1	0.9	0.7	2.7	1.2	0.9	0.9	3.0
Ecuador	1.3	2.2	0.3	3.8	1.2	2.1	0.3	3.6	1.2	2.0	0.3	3.5
El Salvador	1.8	0.5	1.9	4.2	1.6	0.4	1.8	3.8	1.5	0.4	1.8	3.7
Guatemala	0.9	0.7	0.7	2.3	0.8	0.6	0.6	2.0	0.7	0.5	0.6	1.8
Honduras	2.3	1.0	1.4	4.7	2.3	1.1	1.5	4.9	2.3	1.1	1.9	5.3
Mexico	1.8	1.3	0.5	3.6	1.6	1.1	0.5	3.2	1.6	1.1	0.5	3.2
Nicaragua	1.2	0.9	0.3	2.4	1.1	0.8	0.3	2.2	0.9	0.8	0.3	2.0
Panama	2.1	1.9	0.5	4.5	1.6	1.6	0.4	3.6	1.2	1.2	0.4	2.8
Paraguay	1.0	0.3	0.7	2.0	0.9	0.3	0.6	1.8	0.9	0.3	0.6	1.8
Peru	1.7	1.4	0.5	3.6	1.5	1.3	0.5	3.3	1.5	1.1	0.4	3.0
Uruguay	2.0	2.5	1.0	5.5	2.1	2.6	1.1	5.8	2.2	2.9	1.2	6.3
Venezuela	1.7	2.1	1.8	5.6	1.6	1.8	1.8	5.2	1.6	1.6	1.5	4.7
Weighted average	1.3	1.0	1.0	3.0	1.2	0.9	0.9	3.0	1.1	0.8	0.9	2.8

Table IV-14. Latin America: Relationship Between Public Expenditure on Education and Government Budget (%), 1960–90

Country	Educational Exp*/Government Budget 1960	1973	Educational Exp/Budget Minimum Estimate and Slow GNP Growth 1980	1985	1990	Educational Exp/Budget Minimum Estimate and Rapid GNP Growth 1980	1985	1990	Educational Exp/Budget Maximum Estimate and Slow GNP Growth 1980	1985	1990	Educational Exp/Budget Maximum Estimate and Rapid GNP Growth 1980	1985	1990
Argentina	19.0	12.7	7.7	7.2	6.1	7.7	6.1	5.0	9.3	7.7	6.6	9.4	7.7	6.6
Bolivia	19.4	26.2[b]	22.0	21.0	18.9	19.9	15.8	14.2	24.1	23.1	21.0	22.0	18.9	15.7
Brazil	12.4	15.2	11.5	10.5	9.9	7.9	5.8	3.7	16.2	15.2	14.7	11.5	7.9	3.9
Chile	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Colombia	19.7	20.9[c]	21.6	18.9	16.2	18.9	14.8	12.1	33.7	28.3	25.6	29.7	22.9	16.2
Costa Rica	29.6	31.3	24.7	21.4	19.2	19.2	12.6	8.8	30.8	26.4	23.1	23.6	15.9	11.5
Dominican Republic	7.3	13.9[d]	15.3	15.9	16.6	9.0	6.9	4.9	18.8	18.8	20.8	12.5	9.7	6.9
Ecuador	12.8	19.8[c]	19.5	16.5	15.0	14.0	12.0	9.5	19.0	18.0	17.5	16.5	13.5	11.0
El Salvador	18.9	27.6[c]	22.2	21.2	19.1	20.2	16.2	14.1	42.4	38.4	37.4	37.3	31.3	27.3
Guatemala	11.9	14.9	10.2	9.3	8.4	9.3	8.4	6.5	21.4	18.6	16.7	19.5	15.8	13.9
Honduras	16.6	19.4[b]	19.8	20.5	20.5	16.7	16.1	14.9	29.1	30.4	32.9	25.4	24.8	24.2
Mexico	7.1[a]	12.0	14.3	12.7	12.2	12.7	11.7	10.6	19.1	17.0	17.0	[illegible]	15.4	14.3
Nicaragua	15.6	14.6	13.9	12.5	11.9	10.6	7.9	5.3	15.8	14.5	13.2	11.8	9.2	7.3
Panama	21.2	24.9	19.5	16.0	12.5	17.0	13.0	9.0	22.5	18.0	14.0	20.0	14.0	10.5
Paraguay	15.1	14.7[b]	10.05	9.4	8.7	9.4	8.0	6.0	13.4	12.1	12.1	12.1	10.1	8.0
Peru	[illegible]	22.9	16.9	15.9	14.3	14.3	12.7	10.1	19.1	17.5	15.9	16.4	13.8	11.7
Uruguay	[illegible]	—	—	—	—	—	—	—	—	—	—	—	—	—
Venezuela	22.3	24.4	25.5	22.9	21.3	20.8	16.1	13.0	29.1	27.0	24.4	23.9	18.2	14.6
Weighted average	**12.6**	**15.8**	**13.4**	**12.0**	**11.4**	**10.8**	**8.4**	**6.4**	**17.6**	**15.9**	**15.1**	**14.3**	**11.1**	**7.1**

Note: *Data taken from Source No. 5.
[a] 1965 data.
[b] 1970 data.
[c] 1971 data.
[d] 1972 data.

Table A-IV-1. Latin America: Total Enrollment in Primary Education, 1964-1973
(Thousands of students)

Country	Years									
	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Argentina	3,188.5	3,245.5	3,336.6	3,366.9	3,362.3	3,404.4	3,385.8	3,418.7*	3,451.7*	3,485.5
Bolivia	500.9	533.2	559.7	591.6	612.6	636.3*	679.1	698.4*	730.5	770.0
Brazil	10,217.3	9,923.2	10,695.4	11,283.5	11,943.5	12,120.4*	12,812.0	13,623.4	14,082.1	14,804.0
Chile	1,354.5	1,528.7	1,655.4	1,835.3	1,934.5	1,980.8	2,039.2	2,148.4*	2,263.5	2,314.3
Colombia	2,213.4	2,274.0	2,402.0	2,586.3	2,733.4	2,920.8*	3,286.0	3,481.2	3,523.9*	3,751.5
Costa Rica	265.7	283.2	296.0	313.1	328.2	345.1	349.4	356.1	365.5	373.8
Dominican Republic	516.1	55[illegible].7	584.5	649.1	685.6	725.9	773.4	823.5	833.4	865.1
Ecuador	786.7	800.5	841.7	845.2	928.7	970.4	1,016.5	1,057.1	1,101.6	1,167.0
El Salvador	378.1	387.2	431.1	475.2	479.8	516.9	531.3	585.3	618.4	657.2
Guatemala	385.6	404.8	429.8	457.1	493.2	488.6	505.7	530.2*	556.0	571.3
Honduras	257.2	283.6	331.5	366.9	377.0	378.7*	384.7	393.0*	412.0	420.7
Mexico	6,530.7	6,916.2	7,306.1	7,772.2	8,150.4	8,530.5	9,248.3	9,528.2	10,113.1	10,782.7
Nicaragua	199.5	206.2	224.5	246.9	249.2*	262.6	285.3	301.6	305.7	323.4
Panama	196.4	203.4	210.6	218.5	222.5	238.0	255.3	275.0*	305.6	319.1
Paraguay	344.6	357.0	366.2	378.5	399.7	408.5	424.2	433.1*	440.1	451.5
Peru	1,932.6	2,054.0	2,208.3	2,299.0	2,403.9	2,447.0*	2,488.4	2,536.7*	2,586.0*	2,636.3
Uruguay	349.1	359.3	364.3	357.2*	356.2*	355.2*	354.1	353.2*	352.2	356.5
Venezuela	1,397.0	1,453.3	1,510.4	1,550.2	1,602.4	1,681.7	1,768.7	1,838.3	1,894.2	1,924.0
Total:	31,961.9	31,770.8	33,844.1	35,872.7	37,272.1	38,533.6	40,566.4	42,381.4	43,935.7	45,964.4

*Estimated figures.

Notes: 1. The data for 1964–1969 were taken from Source No. 1.
2. The data for 1970–1973 were taken from Source No. 2.

Table A-IV-2. Latin America: Total Enrollment in Secondary Education, 1964–1973
(Thousands of students)

Country	Years									
	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Argentina	743.2	789.1	827.7	863.6	887.2	924.8	974.8	1,022.7*	1,073.0*	1,125.7
Bolivia	86.4	95.5	106.7	115.7	128.9	142.4*	101.9	174.0*	192.3*	212.5*
Brazil	1,892.7	2,154.4	2,483.2	2,809.0	3,205.7	3,723.7*	4,083.6	4,881.2*	5,588.6	6,398.5*
Chile	290.0	318.9	242.0	184.3	229.3	377.1*	302.1	410.0*	427.6*	445.9
Colombia	390.3	434.2	513.4	577.4	586.7	663.1*	739.5	819.[illegible]*	911.4	988.9
Costa Rica	49.3*	52.2	56.3*	58.5*	61.9*	65.6*	61.1	67.7	77.8	82.4*
Dominican Republic	57.1*	63.6*	70.1*	79.0	90.4	98.1*	113.0	121.8	130.7*	151.2*
Ecuador	104.2	117.3	134.3	152.1	166.9	183.4	219.4	262.2*	310.2	342.8
El Salvador	52.3	54.7	59.1	68.9	77.4	84.1	88.3	103.1*	114.6*	127.4
Guatemala	44.1	49.0	53.1	60.3	65.0	71.5*	75.5	86.5*	87.5	104.5
Honduras	21.0	24.0	27.4	31.0	34.6	35.2*	38.8	42.7*	47.0*	51.7
Mexico	728.1	900.8	976.6	1,022.5	1,118.4	1,441.4*	1,584.3	1,762.3	1,971.9	2,306.4
Nicaragua	23.4	26.6	29.6	34.2	38.0*	45.2*	51.4	54.7	61.1	66.6*
Panama	51.0	54.9	58.5	62.5	66.7	69.9	78.5	90.6*	98.6	111.9
Paraguay	34.1	37.3	41.5	42.4	47.3	51.4	55.9	58.0*	62.5	66.7
Peru	319.8	379.6	443.5	510.5	560.0	561.1*	680.1	682.2*	752.2*	829.5
Uruguay	115.3	123.8	131.4*	139.4*	148.0*	157.1*	174.3	176.9*	187.8	193.9
Venezuela	275.8	298.1	326.7	359.4	396.3	448.9	465.9	502.4*	533.6	584.2
Total	**5,278.1**	**5,874.8**	**6,381.1**	**7,178.7**	**7,906.7**	**9,144.8**	**9,869.3**	**11,316.9**	**12,633.6**	**14,192.9**

*Estimated figures.

Notes: 1. The data for 1964–1969 were taken from Source No. 1.
2. The data for 1970–1973 were taken from Source No. 2.

Table A-IV-3. Latin America: Total Enrollment in Higher Education, 1964–1973
(Thousands of students)

Country	Years									
	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Argentina	235.5	246.7	250.9	266.3	265.3	271.5	274.6	298.4	351.3	423.8
Bolivia	14.1	16.9	18.1	21.1	22.9	25.6	26.5	28.1	34.6*	39.4
Brazil	144.3	156.1	181.9	215.3	282.6	354.0*	430.5	555.7*	696.2	785.1
Chile	36.5	42.9	50.1	57.4	62.8	68.0	78.4	101.1	127.2	162.0*
Colombia	37.5	43.2	51.8	55.3	62.8	76.9	85.6	100.8	111.1	124.2
Costa Rica	7.0	7.2	7.6	8.8	11.4	13.1*	15.5	18.6	19.8	22.7*
Dominican Republic	5.2	7.0	6.9	9.9	11.5	16.8	23.5	28.1	34.5	37.5
Ecuador	12.5	15.4	16.0	19.6	25.4	30.8	38.7	43.7	49.3*	55.7*
El Salvador	3.6	3.4	4.3	3.9	3.8	4.5	9.5	12.9	15.4*	20.0
Guatemala	7.8	8.6	9.6	11.0	11.9	14.1	15.6	16.4	19.4	21.9
Honduras	2.1	2.5	2.9	3.0	3.4	3.6	4.8	5.6	6.5*	7.6*
Mexico	126.1	133.4	140.1	154.3	178.4	188.0	247.6	281.4	371.6	408.7
Nicaragua	2.7	3.4	4.0	5.1	6.0	7.2	9.4	9.4	12.5	14.4*
Panama	5.2	7.2	8.1	9.3	10.1	11.3*	8.1	14.2	18.3	21.7
Paraguay	5.3	5.9	6.1	6.7	6.9	7.8*	8.2	10.1	11.6	12.2
Peru	73.1*	79.2	85.8*	93.0*	100.7*	109.2*	124.7	128.2*	138.9	159.3
Uruguay	16.7*	17.6	18.5*	19.4*	20.5*	21.5*	25.0	23.8*	25.0*	26.3
Venezuela	41.4	46.8	53.8	58.7	66.7	72.6	100.8	117.8*	143.8	161.0
Total:	**778.4**	**845.4**	**916.5**	**1,018.1**	**1,153.1**	**1,296.5**	**1,527.0**	**1,794.3**	**2,187.5**	**2,503.5**

*Estimated figures.

Notes: 1. The data for 1964–1969 were taken from Source No. 1.
2. The data for 1970–1973 were taken from Source No. 2.

Table A-IV-4. Latin America: Geometric Growth Rates of Enrollment in Primary, Secondary and Higher Education for the Periods 1964–1967, 1969–1970, 1970–1973.

Countries	Primary			Secondary			Higher		
	1964–67	1967–70	1970–73	1964–67	1967–70	1970–73	1964–67	1967–70	1970–73
Argentina	1.83	0.19	0.97	5.13	4.12	4.91	4.18	1.03	15.56
Bolivia	5.70	4.71	4.28	10.22	11.41	—	14.38	8.16	13.85
Brazil	3.30	4.39	4.84	14.07	13.28	16.98	14.27	25.98	22.17
Chile	10.66	3.57	4.21	−14.02	17.91	13.86	16.29	10.95	27.37[4]
Colombia	5.33	8.31	4.51	13.94	8.60	10.17	13.82	15.68	13.21
Costa Rica	5.89	3.72	2.28	3.40[3]		12.29	7.93	20.77	13.02[4]
Dominican Republic	7.94	6.01	3.81	14.43	11.75	7.88[4]	23.94	33.40	16.86
Ecuador	3.30	6.34	4.71	13.44	14.66	14.34	16.17	25.45	12.92[4]
El Salvador	7.92	3.79	7.68	9.62	8.62	13.00	2.70	32.88	29.78
Guatemala	5.83	3.42	4.15	10.99	7.78	11.44	13.12	12.35	11.97
Honduras	11.15	1.59	3.03	13.86	8.69	9.11	12.62	16.96	16.67[4]
Mexico	5.97	5.97	5.18	11.96	15.71	13.33	6.96	17.07	18.18
Nicaragua	7.36	4.94	3.51	13.48	14.54	9.03[4]	23.61	22.61	15.32
Panama	3.62	5.32	7.72	7.01	7.89	12.54	21.33	−4.50	38.88
Paraguay	3.18	3.87	2.10	7.53	9.59	6.13	8.13	6.97	14.16
Peru	5.96	2.67	1.94	15.87	8.94	7.91	9.50[3]		8.50
Uruguay	2.15[1]	−0.71[2]	0.22	7.37	7.08	3.61	5.15[5]		
Venezuela	3.53	4.51	2.83	9.23	9.04	7.83	12.34	19.75	16.89
Weighted average	**4.89**	**4.49**	**4.23**	**10.75**	**11.48**	**12.82**	**9.45**	**10.40**	**17.98**

Notes:
[1] Data for the period 1964–1966
[2] Data for the period 1966–1970
[3] Data for the period 1965–1970
[4] Data for the period 1970–1972
[5] Data for the period 1965–1973

Table A-IV-5. Latin America: Enrollment Ratios by Level of Education, 1964–1970 (Percentages)

		Year						
Countries	Level	1964	1965	1966	1967	1968	1969	1970
Argentina	Primary	104.09	105.30	107.60	107.91			106.41
	Secondary		33.17	34.41	35.49			37.47
	Higher				11.11	10.60	10.54	11.72
Bolivia	Primary		77.24	78.56	80.48	80.76		85.29
	Secondary			1[illegible].98	23.1	22.18		25.5
	Higher		4.13	4.34	4.97	5.31		6.53
Brazil	Primary		62.68	65.98	67.86	70.27		72.14
	Secondary	18.24	20.14	22.51	24.70			31.63
	Higher		1.83	2.06	2.35	2.97		4.27
Chile	Primary		104.16	111.17	121.47	126.19	127.35	121.03
	Secondary				16.64	20.01	22.57	25.74
	Higher		4.53	5.16	6.00			7.77
Colombia	Primary		59.99	61.89	65.08	67.17		73.83
	Secondary		17.20	20.23	21.89	21.41		24.49
	Higher		2.43	2.61	2.77	3.02		3.78
Costa Rica	Primary		91.75	93.62	96.64	98.88	101.51	95.31
	Secondary		20.90		25.68	25.39	27.98	24.80
	Higher			4.04	4.58	5.67		8.55
Dominican Republic	Primary		73.05	74.27	79.86	81.68	83.75	86.45
	Secondary			13.47	14.59	16.16		18.71
	Higher			1.76	2.43			5.29
Ecuador	Primary	77.39	78.58	80.36	78.47	83.86		87.26
	Secondary		17.94	19.83	21.67			27.49
	Higher		3.05	3.06	3.50			6.37
El Salvador	Primary		66.01	71.10	75.83	74.08	77.21	74.64
	Secondary		14.59		17.49	19.22	20.40	18.65
	Higher				1.27	1.20	1.42	2.65
Guatemala	Primary		44.61	46.01	47.56	49.87	48.10	47.89
	Secondary		8.10	8.48	9.31	9.70		10.37
	Higher		1.81		1.86	2.26	2.55	2.75
Honduras	Primary		63.50	71.78	76.74	76.21		73.70
	Secondary		8.45	9.25	10.10	10.89		11.64
	Higher		1.10	1.23	1.20	1.36		2.98
Mexico	Primary		83.43	83.37	84.92	86.41	87.66	91.07
	Secondary		18.49		19.34	20.59	22.27	23.05
	Higher		3.16	3.18	3.88			4.94
Nicaragua	Primary		57.90	61.24	65.45		65.73	69.83
	Secondary		11.67	12.56	13.97		14.52	18.16
	Higher		1.93	2.27	2.76	3.08		4.57
Panama	Primary		83.43	84.21	85.15	84.55	88.17	91.67
	Secondary		33.78	34.91	36.10	37.28		40.03
	Higher		5.63	6.06	6.68			6.41
Paraguay	Primary		86.71	86.82	87.61	90.33	90.14	92.38
	Secondary		13.08		14.72	15.91	16.75	16.95
	Higher		2.98	2.98	3.14	3.12		2.47
Peru	Primary		92.54	96.59	97.63	99.10		95.61
	Secondary		25.48	28.78	32.01			37.17
	Higher		5.49	6.08	6.62			8.91
Uruguay	Primary	99.43	102.09	103.3[illegible]				96.80
	Secondary		45.31					59.55
	Higher		7.01					9.70
Venezuela	Primary		78.51	79.20	78.[illegible]0	79.17	80.64	79.35
	Secondary		23.31	27.37	28.63	30.05		31.54
	Higher		2.95	6.05	6.27			9.40

Note: Data of population by age group were taken from Source 3.

Table A-IV-6. Latin America: Gross Enrollment Ratios and Overage Ratios

Country	Gross ratio 1970	Overage ratio 1970
Argentina	106.41	13.4
Brazil	72.14	27.5
Chile	121.03	15.0
Costa Rica	95.31	15.1
Dominican Republic	86.45	26.4
El Salvador	74.64	23.5
Guatemala	47.89	23.4
Mexico	91.07	19.0
Nicaragua	89.83	28.1
Panama	91.67	21.1
Paraguay	92.38	21.7
Peru	95.61	30.3

Table A-IV-7. Latin America: Retention of a Cohort of Primary School Students Beginning Their Studies Between 1960 and 1966
(Percentages)

Countries	Beginning of studies Year	Grades							
		1st	2nd	3rd	4th	5th	6th	7th	8th
Argentina	1961	100	82.7	77.0	71.0	55.2	59.3	54.3	
Bolivia	1963	100	59.0	44.0	34.0	28.0	22.0		
Brazil	1966	100	51.3	43.9	35.6	—	—		
Chile	1966	100	76.0	72.0	65.0	58.0	54.0	48.0	41.0
Colombia[a]	1960	100	63.4	40.9	32.1	27.3	—		
Costa Rica	1964	100	90.9	83.4	76.4	70.1	65.2		
Dominican Republic	1965	100	66.2	54.1	42.3	34.0	30.4		
Ecuador	1960	100	66.6	57.9	48.1	39.4	37.2		
El Salvador	1964	100	68.1	58.7	52.6	46.7	43.3		
Guatemala	1962	100	59.0	44.2	33.2	27.7	25.3		
Honduras	1964	100	57.0	44.0	34.0	26.6	21.0		
Mexico	1965	100	67.0	57.0	46.0	39.0	33.0		
Nicaragua	1962	100	42.2	28.0	20.2	16.1	13.4		
Panama	1960	100	94.0	81.8	73.2	66.5	62.3		
Paraguay	1965	100	71.0	54.0	43.0	33.0	25.0		
Peru	1965	100	68.0	55.0	50.0	43.0	38.0		
Uruguay	1963	100	91.3	87.9	82.9	74.5	66.9		
Venezuela	1960	100	71.1	63.2	53.2	45.4	39.4		

[a] Covers five grades of primary school.

Note: Data taken from Source No. 10.

Table A-IV-8. Latin America: Public Current Expenditure on Education per Student in Public Institutions (by Level of Education), 1965–1970
(1970 US$)

	1965			1970					
				Primary		Secondary		Higher	
Country	Primary	Secondary	Higher	Direct Expend	Total* Expend	Direct Expend	Total* Expend	Direct Expend	Total* Expend
Argentina	106.70	254.42	430.23	—	87.2[d]	204.34	294.9[d]	400.92	491.32
Bolivia	28.81	50.69	202.54	42.57	51.6	79.40	96.3	378.41	459.1
Brazil	12.40	126.18	2,702.41	43.69	49.9	76.98	87.9	1,341.84	[illegible]
Chile	63.26	172.78	1,809.45	58.20	66.0	155.35	176.2	1,927.17	[illegible]
Colombia	11.98	41.31	600.29	—	31.60[c]	76.37[c]	97.07[c]	415.78	[illegible]
Costa Rica	58.23	147.47	408.08	71.76	85.0	170.80	202.4	312.16	369.9
Dominican Republic	[a]27.30	76.73	1,325.62	26.27	31.0	95.10	112.2	502.48	592.9
Ecuador	17.78	86.29	802.92	26.51	27.3	147.71	152.1	153.80	158.4
El Salvador	33.49	77.19	598.50	31.10	33.9	90.58	98.7	791.70	862.9
Guatemala	48.12	173.51	475.45	44.33	49.6	148.18	185.9	334.40	374.5
Honduras	38.44	326.76	626.60	37.28	40.8	336.90	369.2	544.34	596.6
Mexico	28.62	798.07	477.11[b]	51.17	63.4	173.40	215.0	258.96	321.1
Nicaragua	39.58	111.17	302.34	40.91	46.6	97.96	111.7	[illegible]	319.6
Panama	68.61	188.81	324.37	88.93	117.3	210.02	277.2	[illegible]	481.2
Paraguay	[a]16.62	52.01	633.95	18.86	20.2	60.96	65.2	299.47	320.4
Peru	57.69	143.76	455.40	50.46	55.0	108.88	118.7	353.18	385.0
Uruguay	119.33	281.12	658.61	143.29	150.4	182.95	192.1	658.43	691.3
Venezuela	97.64	256.08	1,396.92	110.12	126.6	243.81	280.4	1,284.35	1,477.0
Weighted average	**37.74**	**146.11**	**865.07**	**45.74**	**54.33**	**121.85**	**151.90**	**747.81**	**1,318.4**

*The portion for other expenditures has been distributed among the three educational levels.

Notes: [a] 1966 data.
[b] 1971 data.
[c] Data for 1973 taken from Source No. 11.
[d] Data for 1973 taken from Source No. 12.

Table A-IV-9. Latin America: Capital Expenditure per Additional Student Enrolled at the Various Levels, 1970
(1970 US$)

Country	Wage* Chile = 1	Capital Expenditure[1] per student		
		Primary	Secondary	Higher
Argentina	1.31	84.85	168.2	404.0
Bolivia	0.50	27.00	53.5	128.5
Brazil	0.99	63.61	126.0	302.7
Chile	1.00	54.00	107.0	257.0
Colombia	1.05	64.07	126.9	304.9
Costa Rica	2.21	119.34	236.47	567.97
Dominican Republic	1.14	64.02	126.86	304.70
Ecuador	0.65	37.21	73.72	177.07
El Salvador	0.87	51.68	102.40	245.95
Guatemala	1.34	72.36	143.38	344.38
Honduras	0.83	44.82	88.81	213.31
Mexico	1.57	85.63	169.67	407.52
Nicaragua	1.22	65.88	130.54	313.54
Panama	2.30	146.56	290.40	697.5
Paraguay	0.50	27.0	53.5	128.5
Peru	1.15	70.8	140.3	336.93
Uruguay	2.0	108.00	214.0	514.0
Venezuela	2.55	139.07	275.56	661.90

*Data calculated on the basis of Source No. 9.

[1] The portion for other expenditures has been distributed among the three educational levels.

Table A-IV-10. Latin America: Gross Enrollment Ratios in Primary Education: Historical, Minimum and Maximum Estimates, 1965–1990.

Country	Historical				Minimum estimate			Maximum estimate		
	1965	1967	1970	1973	1980	1985	1990	1980	1985	1990
Argentina	105.30	107.91	106.41	107.79	97.80	94.93	94.58	106.70	107.0	106.50
Bolivia	77.24	80.84	85.29	87.25	77.97	77.73	76.91	81.44	81.25	80.33
Brazil	62.68	67.86	72.14	75.51[2]	70.00	68.73	70.00	71.86	72.02	71.94
Chile	104.16	121.47	121.03	136.78	128.02	131.80	135.41	132.65	136.28	140.22
Colombia	59.99	65.08	73.83	80.53	69.21	69.70	70.00	78.46	79.03	79.33
Costa Rica	91.75	96.64	95.31	96.98[2]	99.00	100.30	102.00	109.59	110.96	112.82
Dominican Republic	73.05	79.86	86.45	87.34[2]	87.37	87.80	87.86	88.10	88.44	88.55
Ecuador	78.58	78.47	87.26	91.86	90.41	91.46	92.63	91.90	93.10	94.24
El Salvador	66.01	75.83	74.64	82.26[2]	76.50	76.46	77.50	90.79	90.80	92.00
Guatemala	44.61	47.56	47.89	49.88	37.83	37.93	38.00	52.15	52.30	52.30
Honduras	63.50	76.64	73.70	72.16	73.16	75.11	74.71	76.50	77.49	78.12
Mexico	83.43	84.92	91.07	97.57	92.28	92.86	92.76	103.80	104.12	104.36
Nicaragua	57.90	65.45	69.83	70.45[2]	60.16	59.6[illegible]	58.80	69.22	68.67	67.76
Panama	83.43	85.15	91.67	106.52	82.18	8[illegible].02	83.95	95.73	96.72	97.69
Paraguay	86.71	87.61	92.38	90.91	91.20	91.43	91.56	92.20	92.47	92.56
Peru	92.54	97.63	95.61	98.00	100.40	101.69	102.66	105.17	106.53	107.59
Uruguay	102.09	99.94[1]	96.80	98.46	97.19	96.10	96.45	103.801	103.57	104.00
Venezuela	78.51	78.90	79.35	80.68	80.54	81.50	82.70	82.41	83.39	84.62
Weighted average	**74.81**	**78.36**	**82.88**	**87.87**	**80.8**	**81.81**	**81.34**	**87.88**	**87.2**	**87.6**

[1] 1968 data.
[2] 1972 data.

Notes: Data of population by age group were taken from Source No. 3. The inter-five-year populations have been interpolated.

Table A-IV-11. Latin America: Gross Enrollment Ratios in Secondary Education: Historical, Minimum and Maximum Estimates, 1965–1990.

Country	Historical				Minimum estimate			Maximum estimate		
	1965	1967	1970	1973	1980	1985	1990	1980	1985	1990
Argentina	33.17	35.49	37.47	42.35	38.76	37.84	36.60	43.86	42.81	41.51
Bolivia	20.25	23.10	25.50[1]	36.11	34.71	34.29	33.97	44.07	43.53	43.12
Brazil	20.14	24.70	31.63	41.28[2]	50.42	49.57	48.16	59.00	57.90	56.31
Chile	30.53	16.64	25.74	34.22	38.26	40.69	42.13	42.17	44.85	46.44
Colombia	17.20	21.89	24.49	29.57	32.18	32.25	32.00	44.29	44.30	43.91
Costa Rica	20.90	25.68	24.80	29.18[2]	41.90	43.06	43.14	52.72	54.15	54.23
Dominican Republic	13.22	14.59	18.71	19.48	25.46	25.40	25.09	33.36	33.28	32.87
Ecuador	17.94	21.67	27.49	39.07	49.45	50.38	51.43	55.72	56.86	58.00
El Salvador	14.59	17.49	18.65	24.13	24.48	25.28	27.08	27.83	28.75	30.79
Guatemala	8.10	9.31	10.37	13.09	12.15	12.21	12.40	23.01	23.12	23.49
Honduras	8.45	10.10	11.64	13.59	14.42	14.50	14.57	24.44	24.56	24.70
Mexico	18.49	19.34	23.05	30.25	29.30	29.36	28.53	41.80	41.80	40.62
Nicaragua	11.67	13.97	18.16	20.42[2]	44.50	43.52	41.71	44.73	[illegible]	42.00
Panama	33.78	36.10	40.03	52.49	59.20	60.00	60.28	60.56	[illegible]	61.00
Paraguay	13.06	14.72	16.95	18.86	20.10	20.46	20.50	22.68	[illegible]	23.14
Peru	25.48	32.01	37.17	42.30	49.65	50.72	50.49	54.31	55.40	55.24
Uruguay	45.31	47.05	59.65	66.06	59.00	59.09	58.63	63.30	63.38	62.94
Venezuela	23.31	28.63	31.54	34.79	54.48	56.00	56.17	60.00	61.73	62.00
Weighted average	**20.85**	**23.73**	**28.46**	**37.63**	**[illegible]**	**48.61**	**38.8**	**[illegible]**	**48.31**	**48.38**

[1] 1968 data.
[2] 1972 data.

Note: Data of population by age group were taken from Source No. 3.

Table A-IV-12. Latin America: Gross Enrollment Ratios in Higher Education: Historical, Minimum and Maximum Estimates, 1965–1990

	Historical				Minimum estimate			Maximum estimate		
Country	1965	1967	1970	1973	1980	1985	1990	1980	1985	1990
Argentina	11.89	11.11	11.72	17.14	10.21	10.70	11.25	13.60	14.29	14.98
Bolivia	4.13	4.97	6.53	8.40	5.87	6.08	6.17	6.08	6.17	6.27
Brazil	1.83	2.35	4.27	6.90	3.84	4.09	4.39	9.68	10.32	11.10
Chile	4.53	6.00	7.77	12.12[2]	9.17	10.34	11.76	14.32	16.11	18.23
Colombia	2.43	2.77	3.78	4.81	3.51	3.70	3.90	9.13	9.64	10.15
Costa Rica	5.07	4.58	8.55	9.89[2]	6.33	7.02	[illegible]	10.07	11.10	12.37
Dominican Republic	1.87	2.43	5.29	7.31	3.27	3.53	3.88	6.30	6.81	7.49
Ecuador	3.05	3.59	6.37	6.90[3]	4.19	4.48	4.81	7.16	7.72	8.25
El Salvador	1.52	1.27	2.65	4.93	1.35	1.40	1.47	[illegible]	8.92	[illegible]
Guatemala	1.81	1.86	2.75	3.42	1.74	1.83	1.92	[illegible]	8.91	[illegible]
Honduras	1.10	1.20	2.98	2.31[3]	1.76	1.89	2.04	6.32	6.81	[illegible]
Mexico	3.16	[illegible]	4.94	6.97	5.06	5.59	6.23	10.34	11.41	12.71
Nicaragua	1.93	[illegible]	4.57	5.51[2]	3.01	3.38	3.92	6.48	7.31	8.48
Panama	5.63	6.66	6.41	13.53	5.21	5.25	5.33	8.91	9.00	9.08
Paraguay	2.98	3.14	2.47	4.47	2.56	2.63	2.67	7.37	7.52	7.70
Peru	5.49	6.62	8.91	10.18	5.02	5.25	5.49	8.56	8.98	7.94
Uruguay	7.01	7.81[1]	9.70	10.06	9.01	8.63	8.51	11.94	11.99	12.06
Venezuela	2.95	6.27	9.40	12.62	7.95	8.04	8.13	11.41	11.54	11.67
Weighted average	**3.7**	**4.2**	**5.7**	**8.3**	**4.9**	**5.2**	**5.5**	**9.9**	**10.6**	**11.3**

[1] 1968 data.
[2] 1972 data.
[3] 1971 data.

Note: Data of population by age group were taken from Source No. 3. The inter-five-year populations have been interpolated.

Table A-IV-13. Latin America: Geometric Growth Rates of Enrollment in Primary, Secondary and Higher Education. Minimum Estimate, 1970–1990

	Primary			Secondary			Higher		
	1970–1980	1980–1985	1985–1990	1970–1980	1980–1985	1985–1990	1970–1980	1980–1985	1985–1990
Argentina	—	0.8	0.6	1.0	0.4	0.8	−0.1	1.5	1.7
Bolivia	2.2	2.2	2.0	9.7	2.7	2.4	2.0	5.3	3.4
Brazil	2.2	3.1	2.0	7.3	2.3	2.2	2.2	3.7	4.2
Chile	0.2	1.3	2.2	6.3	0.3	0.9	4.6	4.0	1.8
Colombia	0.1	1.6	2.8	5.7	0.2	0.6	3.3	4.0	1.6
Costa Rica	0.8	0.5	2.2	8.6	0.4	−0.4	1.7	4.7	2.5
Dominican Republic	3.4	3.4	3.3	8.6	3.5	3.1	−0.6	4.8	5.6
Ecuador	3.1	3.3	3.6	9.4	3.1	3.3	−0.4	4.7	4.4
El Salvador	3.0	2.9	3.1	8.1	3.4	4.6	−2.7	3.8	4.0
Guatemala	0.4	2.9	2.2	4.7	2.7	3.5	−1.0	4.3	3.5
Honduras	3.6	4.0	2.9	8.1	3.9	3.6	3.5	5.8	5.6
Mexico	3.1	3.5	3.5	5.8	2.9	2.8	4.7	5.4	5.1
Nicaragua	1.7	3.2	2.7	12.6	2.9	2.7	−0.2	5.6	6.4
Panama	1.1	1.1	0.6	6.8	2.4	1.4	3.4	2.8	2.6
Paraguay	2.5	2.6	2.7	4.3	3.1	2.5	0.8	3.2	3.2
Peru	2.9	2.6	2.8	6.2	2.7	2.0	−2.1	4.1	3.4
Uruguay	—	0.4	0.6	0.1	0.2	0.8	—	0.2	—
Venezuela	2.2	2.6	3.5	9.4	1.8	2.4	3.4	3.5	1.5
Weighted average	**2.1**	**2.8**	**2.6**	**6.4**	**2.1**	**2.1**	**2.1**	**3.8**	**3.8**

Table A-IV-14. Latin America: Geometric Growth Rates of Enrollment in Primary, Secondary and Higher Education. Maximum Estimate, 1970–1990

	Primary			Secondary			Higher		
	1970–1980	1980–1985	1985–1990	1970–1980	1980–1985	1985–1990	1970–1980	1980–1985	1985–1990
Argentina	0.8	1.4	0.6	2.2	0.4	0.8	2.8	1.6	1.6
Bolivia	2.6	2.3	2.0	1.2	2.7	2.3	2.9	3.6	3.4
Brazil	2.5	3.0	2.0	8.6	[illegible]	2.2	11.5	3.7	4.1
Chile	0.6	1.3	2.2	7.1	[illegible]	0.9	9.0	3.8	1.7
Colombia	[illegible]	1.6	2.8	8.8	0.1	0.5	12.8	3.9	1.6
Costa Rica	1.8	0.5	2.2	10.6	0.4	−.4	[illegible]	4.5	2.5
Dominican Republic	3.5	3.3	3.3	9.1	3.4	3.0	6.0	4.7	5.4
Ecuador	3.2	3.3	3.5	10.2	3.1	3.3	4.9	4.8	4.2
El Salvador	4.7	2.9	3.1	7.2	3.4	4.5	15.7	3.9	3.9
Guatemala	3.5	2.8	2.2	11.0	[illegible]	3.4	14.8	4.2	3.6
Honduras	4.0	3.6	3.1	11.2	[illegible]	3.5	16.2	5.7	5.4
Mexico	4.2	3.4	3.4	9.7	[illegible]	2.7	11.8	5.3	4.9
Nicaragua	3.1	3.2	2.6	11.9	2.8	2.7	7.4	5.6	6.2
Panama	2.6	1.1	0.6	6.8	2.3	1.4	8.7	2.9	2.4
Paraguay	2.5	2.6	[illegible]	5.4	3.0	2.3	11.4	3.0	3.3
Peru	3.3	2.5	2.7	6.9	2.6	2.0	3.2	4.0	0.0
Uruguay	0.6	0.5	0.6	0.5	0.2	0.8	2.8	1.1	0.4
Venezuela	2.0	3.5	3.4	10.0	1.8	2.4	7.0	3.4	[illegible]
Total:	**2.7**	**2.8**	**2.6**	**8.2**	**2.1**	**2.1**	**9.1**	**3.9**	**3.4**

CHAPTER V

The Public Sector and Educational Expenditures in Latin America

Fernando Rezende[1]

INTRODUCTION

The purpose of this paper is to analyze the impact of an increase in expenditure on education on the size of the public sector. As is well known, the growing need for government intervention to reduce social inequalities raises questions about the capacity of government to satisfactorily withstand the increasing pressure to increase social costs. Thus, unless it is possible to maintain an increasing rate of government intervention, disputes about the allocation of public resources could arise and make the achievement of educational goals more difficult.

It should be stated at the outset that such an analysis cannot be based on historical evidence of the development of the public sector since the necessary statistical data are unavailable. The increasing decentralization of the public administration and the diversity of institutional forms adopted by the individual governments preclude a comparative historical analysis of the changes the pattern of expenditure has undergone in the recent past. For the same reason, it is impossible to make definitive comparisons of the present size of the public sector based on data published by international organizations. Such data cover only the central agencies of the government and omit most of the expenditures made by autonomous agencies or government enterprises. Thus, although the expenditure/GNP (gross national product) ratio is a better indicator of the size of the public sector than the tax burden coefficient, consistent data cannot be obtained unless an extensive, direct investigation is made in each country.

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However, the accurate measurement of the size of the public sector in the individual countries is not the purpose of this paper. Nor will any attempt be made to specify the best way of measuring the degree of government intervention in the economy. The principal objective is to ascertain the limits of growth of expenditure on education, as determined by the capacity of the government to obtain resources from the private sector for financing the direct production of educational services. Since the production of educational services is largely included in the budget of the central government and since taxes are the largest component of budgetary resources, the coefficients of tax pressure are a good indicator of financing capacity and consequently of the financial limits of growth of the public supply of those services. And there are, of course, political constraints on a continuing and sharp rise in the aggregate coefficients of tax pressure in economic systems primarily based on private initiative. Thus, recognition of the existence of those limits implies that there will be no radical changes in the economic organization of Latin American countries in the direction of greater collectivization of production. Nevertheless, this paper does not attempt to set the above-mentioned limits. The model used seeks, on the basis of certain postulates, to quantify the increase in the coefficients of tax pressure for different rates of educational investment. Any judgment on what the limit on that growth is in a particular country is outside the scope of the purely technical conditions and depends on political and institutional arguments.

For the same reason, the model does not examine the possibility that the growth rate of public expenditure may be temporarily affected by changes in political priorities that entail a reduction in armament expenditure and the transfer of resources to educational programs. In any event, it should be borne in mind that any such change would not permanently eliminate the fiscal pressure due to successive increases in educational programs since its effect would be felt only once.

As this paper points out, another possible way of overcoming the limits due to tax constraints is to change the way of organizing production by setting up government enterprises or by granting subsidies to private enterprises. In these cases, the financing responsibility would be transferred directly to the user or consumer of the services, who would be liable for direct payment of the services provided. Nevertheless, it should be pointed out that the transfer of educational services to the private sector is an undesirable solution from the point of view of achieving greater equity in distributing the benefits of educational programs.

A. PARTICIPATION OF THE PUBLIC SECTOR IN THE ECONOMIES OF LATIN AMERICA

The evidence available indicates that, in most Latin American countries, the participation of the public sector in the economy (measured by the traditional indicators of the tax burden) has remained at lower levels than in other regions of the world where the less developed countries are concentrated. According to the study of Lotz and Morss (1), public revenue as a percentage of the gross national product (GNP) ranged from 9.3% (Guatemala) to 2.14% (Brazil) in the early sixties, and was clearly related to the level of *per capita* income, the size of the country, and the subregions of the continent. Generally speaking, the small Central American countries were at the bottom of the list, with tax burden coefficients of between 9 and 10% while the more developed and larger countries of the Southern Cone were at the top with coefficients of around 20% (see Table V-1). In the same period, most of the African countries had relatively higher tax burden coefficients. The average for the African countries included in the Lotz and Morss sample was 15.7% while the average for Latin America and Asia was around 14.5% (see Table V-2).

Toward the end of the decade, a new study on the same subject by Chelliah *et al.* (2) showed that regional differences increased during the sixties. Assuming the findings of these two studies to be completely comparable, the public revenue/GNP ratio remained more or less stationary in most Latin American countries. The regional average stood at around 14%, while the average tax burden coefficient increased to 19.2% in Africa and 15.1% in Asia (see Table V-2).

More recent information comparable with the data used in the foregoing studies is not readily available. The statistics released by international agencies usually refer exclusively to the central government, and underestimate the size of the public sector in those countries where the state, provincial, or local governments directly mobilize substantial amounts of resources. A comparison of the data published in the IDB annual reports, for example, with those mentioned above, suggests that underestimation is greater in the larger countries (Argentina, Brazil and Mexico). In the other countries the coefficients of the public revenue/GNP shown in those reports are reasonably consistent with the findings of the above-mentioned studies, and once again indicate the relative stability of the values in recent years; and 3-year averages for the 1973-75 period resemble those pinpointed by Lotz and Morss in the early sixties. It should also be noted that these findings are confirmed in a recent ECLA publication (3) that shows that the product elasticity of the tax system was only slightly higher than unity for Latin America as a whole over the 1960-73 period (see Table V-3).

The first impression produced by these data is the small size of the public sector in most of the Latin American countries; this contradicts superficial impressions regarding the degree of State participation in the economies of the developing countries. Furthermore, in addition to being limited in the past 15 years, this participation has not increased as substantially as one would be led to believe from certain theories of the growth of public expenditure, which posit a public sector growth more than proportional to the increase in the level of development.

In any case, these impressions should be treated with caution. As is well known, one of the characteristics of public sector growth in the postwar period has been a growing diversification in the methods of producing goods and services by the government. As a result of the concern for development and the repeated criticisms of the inefficiency of the government bureaucracy, public agencies with a high level of administrative and financial autonomy were established to expedite the process of decision-making and to streamline the execution of top priority development programs and projects. The proliferation of autonomous agencies, corporations, public enterprises and semi-public companies helped to diversify methods of mobilizing resources for financing public sector production, and reduced the importance of tax revenue and of the "direct administration" in the consolidated budget of the public sector.

In some countries for which information was available, the differences between the size of the consolidated public sector and its more traditional indicators are rather considerable. The most complete study published in recent years deals with Bolivia (4). In this study Musgrave shows that, even if only the central government is considered, the overall tax burden indicators previously presented for that country are underestimated. The tax revenue/GNP ratio presented is between 14 and 15% in 1975 (depending on whether or not certain related revenues are included in the calculaton of that ratio), whereas the higher figure in Table V-1 was 11.7%, the average for the 1973–1975 period. Furthermore, a consolidation of all public revenues for 1975 shows that the central government was responsible for just over one third of the resources mobilized by the Bolivian public sector. If the revenue of the decentralized administration services and local governments is added to that of the central government, the total for 1975 is 13,960 million Bolivian pesos, or nearly 30% of the country's GNP. If, in addition, the resources mobilized by government enterprises are added, the coefficient rises to nearly 40%.

Studies are also available for Argentina and Brazil. In the case of Argentina, the study by Villavicencio (5) confirms the impression of a decrease in the tax effort coefficient in the period 1968–72 (Table V-1), even though the coefficients for the total of the central, provincial, and municipal governments are somewhat higher (20.5% in 1968 as against 15% in 1972). Nevertheless, for the public sector as a whole, the coefficients of government participation in the Argentine economy are twice as high and remain relatively stable throughout the 1965–72 period. Government enterprises, corporations, and the social security system mobilize an amount of resources roughly equivalent to that mobilized by the national, provincial, and municipal governments together, so that the sum of the expenditures of all of those public institutions represents about one third of the GNP of the country.

In the case of Brazil, a study by the author of this paper (6) shows a similar picture. In 1969, the budgetary resources of the federal government (central administration) amounted to 16 billion cruzeiros. If the decentralized agencies, including the social security institutions, are included, that total increases to around 24 billion cruzeiros; finally, when the resources of the states and their respective units are added, the grand total comes to 44 billion cruzeiros. This means that the consolidated public sector is almost three times greater than the relative share of the federal government and in 1969 represented close to one third of the GNP of Brazil. It should be noted that this percentage would increase by more than 40% if government enterprises were included in the definition of public sector, since in the same year they accounted for slightly more than 10% of the income generated in the private sector of the economy.

Earlier studies that are less comprehensive from the point of view of presenting data are available for the entire public sector of Colombia, Peru, Panama and Venezuela (7–10). For Peru, the consolidation refers to 1964, when an incomplete survey of the autonomous agencies showed that they accounted for about two-thirds of central government resources. Furthermore, even in a small country like Panama, the autonomous agencies already represented about one-third of the central government in 1961. Since the expansion of those agencies probably accelerated in the last 15 years, the situation of those countries must resemble that of Bolivia, Argentina and Brazil, that is, a group of autonomous public agencies equivalent in size to the traditional public sector.

With the exception of Argentina, Brazil and Colombia—where the states, provinces, departments, and municipalities represent close to 40% of the total of the government—the studies mentioned show that the local governments are less important, which confirms the impression obtained from comparing the data from various sources presented in Table V-1. For Bolivia, Panama and Peru, the share of the departmental, provincial, and municipal governments is estimated at less than 5% of the revenue of the central government. In the case of Venezuela, that share was somewhat higher and amounted to around 12% in 1958-59.

These findings suggest that the major limitation on a quantitative analysis of the public sector is the lack of updated and consistent data for all government institutions, primarily autonomous agencies and government enterprises, which expanded in response to greater diversification in the economic activities of the government and more specific goals of administrative modernization.

Besides making it difficult to correctly estimate the size of the public sector and its relative importance in the economy, this marked decentralization in the execution of government activities further diversifies the methods of financing the production of goods and services by the public sector and calls for greater care in analyzing the possible financial limits of the growth of government activity.

B. SOCIAL PUBLIC EXPENDITURES IN LATIN AMERICA

Administrative decentralization also hinders a correct evaluation of the "trade offs" based on analysis of the pattern of expenditures. In most countries the "social programs" of education still depend primarily on budgetary allocations for financing both investment and consumption expenditures. In the area of health, the medical care programs are frequently associated with the social security systems and, therefore, use resources from specific social security contributions. In the area of sanitation, the most important programs at the urban level (water supply and sewerage) have been increasingly made the responsibility of government enterprises whose principal source of financing is the rates they charge the users of the services. In the area of housing, the recent trend has also been to set up special financing funds in order to reduce the subsidies provided by the government budget.

It is therefore not surprising that an analysis of the pattern of expenditures based solely on data from the central government budget shows a relatively greater share of expenditures on education compared with the other social programs. As shown by the data presented in the annual reports of the IDB and compiled in Table V-4, the percentage of expenditure on education is several times higher than that on health care and housing in most of the countries in the hemisphere. Nevertheless, this conclusion changes somewhat if more comprehensive information is used. Data recently published by the International Monetary Fund—which also include, for some countries, extra-budgetary resources derived from social security contributions—show that the inclusion of those resources in the revenue of the central government substantially changes the pattern of expenditure of the countries for which the information was obtained. As shown by the percentages in Table V-5, in the countries for which the IMF survey included expenditures made by social security institutions (Chile, Mexico, Nicaragua, Paraguay and Uruguay) those programs now loom large in the pattern of expenditure, which shows the importance of those contributions in the overall resources mobilized by the government. It is therefore difficult to argue that a high percentage of expenditure on education offsets a small volume of public resources for other social programs. To the extent that most of these other programs are beginning to use other sources of funds, it is impossible to evaluate changes in priorities (or preferences) solely on the basis of the resources allocated in the budget.

Nevertheless, there are other explanations for the relatively large share of educational expenditure. First of all, the growing centralization of fiscal policy decisions leads to even greater intervention by the central government in typically local functions. More complete studies on the composition of the public sector in some Latin American countries show that, in most of them, the share of local governments is relatively insignificant and does not exceed 5% of the national budget. Furthermore, since tax revenues of the central governments tend to increase more rapidly than those of the local governments, the trend has been to increase the level of concentration of tax revenue at the national level.

The second factor that explains the increase in educational expenditure is the high coefficient of current resources needed to support the program. Although we know of no studies on this topic, it is reasonable to assume that the volume of financial resources needed for operating new educational units is at least equal to the resources used to construct and equip them. Thus, an increase in investments would have a subsequent effect on current expenditures and produce a cumulative growth in government expenditure on education. Furthermore, since in this type of program the quality of the service depends on a larger volume of current expenditures, the pressure to increase those expenditures does not cease when an adequate supply of school places is achieved, since thereafter concern about the quality of education becomes increasingly greater.

This aspect is extremely important in analyzing the prospects for tax pressure that greater priority to education in the developing countries would entail. The next chapter deals with this problem on the basis of various hypothetical quantitative simulations.

C. MODEL FOR DETERMINING THE LIMITS OF GROWTH OF PUBLIC EXPENDITURE ON EDUCATION

International comparisons aimed at evaluating the educational effort of the governments of developing countries have been based on coefficients that measure the relationship between public expenditure on education and the gross national product. As a general rule, this indicator shows values that are considerably below those obtained for developed countries, which justifies recommendations that more financial resources be allocated to that sector.

What, then, are the consequences of an increase in the volume of public resources for financing the expansion of educational programs? A mathematical exercise furnishes more specific elements for answering that question. Let us consider, initially, the following equations:

$$G_t = C_t + I_t \tag{1}$$

$$G_t = T_t \tag{2}$$

$$T_t = \alpha Y_t \tag{3}$$

$$C_t = \beta G_t \tag{4}$$

$$E_t = \gamma I_t \tag{5}$$

$$\Delta C_t = \lambda I_t \tag{6}$$

where *G* represents total public expenditure; *C* and *I*, current and investment expenditures, respectively; *T*, tax revenue; and *E*, the volume of investments in educational programs. The coefficient α is the indicator of the size of the public sector and initially represents both the coefficient of overall tax effort and the expenditure/GNP coefficient.

The volume of public expenditure in a given period *t* is obtained from the following equation:

$$G_t = \alpha Y_t$$

hence:

$$C_t = \alpha\beta Y_t$$

$$I_t = \alpha Y_t - \alpha\beta Y_t = \alpha Y_t(1 - \beta)$$

The volume of current expenditures in the period $t + 1$ depends on the volume and the composition of the investments made in the period *t*. We know that social programs have a high coefficient λ of growth in current expenditures for a given level of investments, whereas the same coefficient is reduced in the case of programs for developing the economic infrastructure. Thus, the composition of the investments affects the average value of the coefficient λ and the growth rate of current expenditure. With the previous hypotheses, current expenditure in the period $t + 1$ will be determined by the following equation:

$$C_t + 1 = C_t + \lambda I_t$$

$$C_t + 1 = \alpha\beta Y_t + [\alpha Y_t(1 - \beta)]$$

$$C_t + 1 = \alpha\beta Y_t + \lambda\alpha Y_t - \lambda\alpha\beta Y_t$$

or

$$\frac{C_t + 1}{C_t} = \frac{\alpha\beta Y_t + \lambda\alpha Y_t - \lambda\alpha\beta Y_t}{\alpha\beta Y_t} = 1 + \frac{\lambda}{\beta} - \lambda$$

That is to say, the growth rate of current expenditure depends upon the parameters β (ratio of current expenditure to total government expenditure) and λ (ratio of the increase in current expenditure to the level of investments). For $\beta = 0.8$ and $\lambda = 0.6$, for example, the ratio $C_t + 1/C_t$ would be equal to 1.15, which would represent a real growth of 15% in current government expenditure over the preceding year.

Controlling the parameter λ would therefore be one way of controlling the growth of current expenditure. This parameter, as we have seen, depends upon the composition of investments and should increase as the share of social programs in total investments increases. Among the social programs, educational programs warrant special mention, since they require a high volume of current (operating) expenditures for a given level of investments. Thus, the share of educational investments in total investments affects the growth rate of current expenditure and the relative size of the public sector, measured by the public expenditure/GNP ratio.

Let us assume that, for the educational programs as a whole, the ratio $\Delta C/I$ is equal to 1 and, for the other programs whose investments are financed out of budgetary resources, that same coefficient is equal to 0, so that the value of λ depends exclusively on the coefficient $E/I = \gamma$.[2] In this case, the foregoing exercise could be reformulated as follows:

$$C_t = \alpha\beta Y_t$$

$$C_t + 1 = \alpha\beta Y_t + E_t$$

$$C_t + 1 = \alpha\beta Y_t + \gamma I_t$$

since

$$I_t = (1 - \beta)\,\alpha Y_t$$

$$C_t + 1 = \alpha\beta Y_t + \gamma\,[\alpha Y_t - \alpha\beta Y_t]$$

$$C_t + 1 = (\alpha\beta + \gamma\alpha - \alpha\beta\gamma) Y_t$$

and

$$\frac{C_t + 1}{C_t} = 1 + \frac{\gamma}{\beta}\gamma$$

For $\beta = 0.8$ and $\gamma = 0.2$, the ratio of current expenditure in the period $t + 1$ to current expenditure in the period t would be equal to 1.05, that is, an increase of 5% over the preceding period.

This increase in current expenditure would clearly entail additional pressure on the budget and have two possible consequences: (1) a reduction in the percentage of public investments in relation to GNP; and (2) an increase in the size of the public sector, measured by the ratio of total expenditure to GNP.

The first alternative, that is, a reduction in the percentage of investment, would run counter to the emphasis usually placed on the rate of investment in formulating growth policies. The second alternative, an increase in the size of the public sector, would run counter to the desire to give greater importance to private initiative in development models.

An attempt at quantification is helpful in establishing a more correct assessment of these problems. The following questions have to be answered: (1) what proportion of investments in education is compatible with the goal of keeping the G/Y (total public expenditure/GNP) and I/G (public investment expenditure/total public expenditure) ratios constant? (2) what increase in G/Y is necessary to maintain a constant I/G ratio, given a fixed coefficient of educational investments as a share of the total budget?

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[2] We are assuming, for purposes of simplification, that the public investments financed out of tax revenues are distributed between educational programs (with a coefficient of 1 in the growth of current expenditures in relation to new investments) and infrastructure programs (where that coefficient is considered to be equal to 0).

The answer to these questions also depends on the growth rate of the GNP. For a GNP growth rate of θ, the total expenditure in the period $t + 1$ would be equal to:

$$G_{t+1} = C_{t+1} + I_{t+1}$$

since

$$C_{t+1} = (\alpha\beta + \gamma\alpha - \alpha\beta\gamma)Y_t$$

$$G_{t+1} = [\alpha\beta + \gamma\alpha(1 - \beta)]\, Y_t + I_{t+1}$$

The first restriction, that is, to maintain the I/G ratio constant, allows that:

$$\frac{I_{t+1}}{G_{t+1}} = \frac{I_t}{G_t} = 1 - \beta$$

Therefore, $I_{t+1} = (1 - \beta)\, G_{t+1}$
and since $Y_{t+1} = Y_t(1 + \theta)$

$$\frac{G_{t+1}}{Y_{t+1}} = \frac{\alpha\beta + \gamma\alpha(1 - \beta)}{1 + \theta} + \frac{I_{t+1}}{G_{t+1}} \cdot \frac{G_{t+1}}{Y_{t+1}}$$

or

$$\frac{G_{t+1}}{Y_{t+1}} \cdot \beta = \frac{\alpha\beta + \gamma\alpha(1 - \beta)}{1 + \theta}$$

and

$$\frac{G_{t+1}}{Y_{t+1}} = \frac{\alpha\beta + \gamma\alpha(1 - \beta)}{\beta(1 + \theta)}$$

The ratio $\dfrac{G_{t+1}}{Y_{t+1}} \Big/ \dfrac{G_t}{Y_t}$ would then be equal to

$$\frac{G_{t+1}/Y_{t+1}}{G_t/Y_t} = \frac{\alpha\beta + \gamma\alpha(1 - \beta)}{\beta(1 + \theta)} \cdot \frac{1}{\alpha} = \frac{\beta + \gamma(1 - \beta)}{\beta(1 + \theta)}$$

In order to satisfy the hypothesis of keeping the G/Y ratio constant, the abovementioned ratio should be equal to 1, and the proportion of educational investment compatible with that hypothesis would be determined by:

$$\gamma = \frac{\beta\theta}{1 - \beta}, \quad \text{that is,} \quad \frac{\gamma}{\theta} = \frac{\beta}{1 - \beta}$$

which would be the condition necessary for both the G/Y and I/G ratios to remain constant throughout time.

For the value of β previously considered, the ratio γ/θ would be equal to 4, that is, the percentage of investments in education (in relation to total public investments) could be, at the maximum, equal to 4 times the growth rate of the GNP if the previously stated conditions of stability in the G/Y and I/G ratios are to be met. Under these conditions, the above-mentioned hypothesis of 20% of investments allocated to education would be compatible with an economic growth rate of 5%.[3]

As for the second question, the answer to the first shows that an increase in the G/Y ratio would occur whenever the proportion of educational investments in total investments (γ) is established at a level greater than 4 times the growth rate of the GNP (the proportion of current expenditures in total expenditures (β) also remaining constant).[4] Thus, if the GNP growth rate (θ) is equivalent to 5% and the percentage of educational investment (γ) is established at 30%, the annual increase in the coefficient α would be determined as follows:

$$\frac{G_{t+1}/Y_{t+1}}{G_t/Y_t} = \frac{\beta + \gamma(1-\beta)}{\beta(1+\theta)} = 1{,}024$$

The result therefore points to an annual growth of 2.4% in the ratio of total expenditure to GNP, one of the overall indicators of government participation in the economy.

Table V-6 shows some alternative simulations that consider different hypotheses for the values of the parameters used in the previous exercise.

It is noteworthy that the greater the difference between the percentage of investments in education and the growth rate of the GNP, the greater the rate of annual growth in the degree of government participation in the economy will be. Therefore, the growth rate of the GNP places an important limit on the government's capacity to finance educational programs, given the existing restrictions concerning substantial and very rapid increases in the degrees of state control.

Since public investments represent a significant share of total investments in most of the Latin American countries, the composition of those investments plays an important role in determining economic growth rates. If investments in economic infrastructure have a more direct and immediate effect on the growth rate of GNP than social investments, a greater proportion of those investments in total public investments could make a relatively higher rate of social investments financially feasible in the course of time.

On the other hand, the lack of a long-term approach to the planning of government expenditures could explain the high level of instability in the proportion of public investments allocated to education, since a very high percentage of investments in a given period causes financial crises in the following period, which completely disrupts decisions about the allocation of new investments.

Obviously, one way of avoiding or at least delaying such financial crises is to attempt to reduce current expenditure through administrative rationalization measures (in the foregoing model, this would mean an effort to reduce the value of the coefficient β). Such efforts, however, produce very questionable results from the viewpoint of the quality of the service rendered and of the equitable distribution of program benefits. Since most of the current expenditures of educational programs are for wages and salaries,[5] a reduction in current expenditures is normally brought about by granting wage increases that are less than the inflation rate, which produces a fall in the real wages of the labor force employed in the sector. If the real wages are low, the average quality and the interest of the personnel employed in the sector decreases, which is reflected in a sharp decline in the quality of education.

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[3] It should be pointed out that we are only considering the educational program. If other social programs were competing with education for budgetary resources, that percentage would have to be distributed among them.

[4] When the proportion of current expenditure (β) is established, the proportion of investments is also automatically established, since it is its complement ($1-\beta$).

Another possibility is that emphasis on a reduction in current expenditure may produce changes in the method of organizing the production of the service. Instead of expanding its production, which, as we have seen, causes future problems in allocating financial resources for its operation, the Government may perhaps give greater importance to expanding private education by granting fiscal or credit incentives. It should be noted, however, that although this strategy reduces the tax pressure of educational programs, it causes considerable distortions in the distribution of program benefits. We shall return to this point further on.

D. EXPANSION OF THE MODEL TO INCLUDE FINANCING THROUGH PUBLIC DEBT

In the foregoing simulations it was assumed that government investments are entirely financed by tax revenue, so that an increase in current expenditure always implies a decrease in savings on current account of the government and in investment expenditure.

To judge from information recently published by ECLA, it is difficult to reconcile this hypothesis with the reality in Latin American countries, where government savings on current account are virtually non-existent.[6] In this case, the financing of investments comes to depend on extra-budgetary resources and/or credit operations, which results in the sum of expenditures (current and investment expenditures) exceeding the limit set by tax revenue.

An increase in the proportion of current expenditure does not necessarily lead to a reduction in investments, since other forms of financing can be mobilized. Nevertheless, the likelihood that this solution will generate future problems, principally as regards the growth rate of the public sector, is increased.

Let us assume, then, that the volume of expenditure exceeds the tax revenue and that the deficit (D) is financed by means of public debt instruments. The equation (2) in section C will now be replaced by:

$$G_t = T_t + D_t \qquad (2')$$

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[5] According to the study of José Maria Dagnino Pastore presented to the previous seminar on the financing of education, the share of staff expenditures in total current expenditures averages approximately 70% in all the countries of the hemisphere (11, p. 156).

[6] The proportion current expenditures represent in the GNP, according to the data in Table V-7, exceeds the tax burden coefficients in most of the countries presented in Table V-1, which indicates that there are no savings on current account of the government.

and the following equation is added to the model:

$$D_t = \delta Y_t \tag{7}$$

The device of using debt causes another interesting change, namely the fact that these operations generate future finance charges in the form of interest payments on the debt. It thus becomes necessary to add the hypothesis that these periodic payments will be perpetual, according to the following equation:

$$R_t = rD_t$$

where r represents the interest rate paid by the government.[7]

With these changes, we would obtain the following result:

$$G_t = (\alpha + \delta)Y_t$$

$$C_t = \beta T_t = \beta\alpha Y_t$$

$$I_t = (1-\beta)T_t + D_t = (1-\beta)\alpha Y_t + \delta Y_t = [(1-\beta)\alpha + \delta]\, Y_t$$

$$C_{t+1} = C_t + \gamma I_t + rD_t = \alpha\beta Y_t + \gamma\,[(1-\beta)\alpha + \delta]Y_t + r\delta Y_t$$

$$G_{t+1} = C_{t+1} + I_{t+1} = [\alpha\beta + \gamma\alpha(1-\beta) + \gamma\delta + r\delta]Y_t + I_{t+1}$$

If the proportion of investments to total expenditures is to remain constant, it is necessary that:

$$\frac{I_{t+1}}{G_{t+1}} = \frac{I_t}{G_t} = \frac{(1-\beta)\alpha + \delta}{\alpha + \delta}$$

since

$$Y_{t+1} = Y_t(1 + \theta)$$

$$\frac{G_{t+1}}{Y_{t+1}} = \frac{\alpha\beta + \gamma\alpha(1-\beta) + \gamma\delta + r\delta}{1 + \theta} + \frac{I_{t+1}}{G_{t+1}} \cdot \frac{G_{t+1}}{Y_{t+1}}$$

or

$$\frac{G_{t+1}}{Y_{t+1}}\left[1 - \frac{(1-\beta)\alpha + \delta}{\alpha + \delta}\right] = \frac{\alpha\beta + \gamma\alpha(1-\beta) + \gamma\delta + r\delta}{1 + \theta}$$

where

$$\frac{G_{t+1}}{Y_{t+1}} = \frac{(\alpha + \delta)\,[\alpha\beta + \gamma\alpha(1-\beta) + \gamma\delta + r\delta]}{\alpha\beta(1 + \theta)}$$

---

[7] R_t represents the flow of interest payments for the debt contracted in the period. It is assumed that the charges accumulated earlier are included in the current expenditure C_t.

[illegible] since

$$\frac{G_t}{Y_t} = \alpha + \delta$$

$$\frac{G_{t+1}/Y_{t+1}}{G_t/Y_t} = \frac{\alpha\beta + \gamma\alpha(1-\beta) + \gamma\delta + r\delta}{\alpha\beta(1+\theta)}$$

or, the growth rate

$$\frac{G_{t+1}/Y_{t+1}}{G_t/Y_t} - 1 = \frac{\gamma(1-\beta) + (\gamma + r)\,\delta/\alpha - \beta\,\theta}{\beta(1+\theta)}$$

It can now be seen that, in addition to the foregoing parameters, the growth rate of the public expenditure/GNP ratio also depends on the structure of the financing, that is, on the proportion between debt and taxes in the financing of investments. Other things being equal, the greater the portion of investments financed by public debt resources, the greater the growth rate of the public sector. As shown by the results presented in Table V-8, for a constant investment coefficient equal to 30% of the expenditure, the growth rate of the *G/Y* ratio increases as the value of β increases, that is, as the proportion of debt in the financing of investments increases.

The maximum percentage of educational investments compatible with the foregoing hypotheses in which the *I/G* and *G/Y* ratios remain constant, would be obtained when the growth rate defined in the equation above is equal to zero. With the modifications now introduced, this percentage would be obtained as follows:

$$\frac{G_{t+1}/Y_{t+1}}{G_t/Y_t} - 1 = 0$$

or

$$\gamma(1-\beta) + (\gamma + r)\,\delta/\alpha - \beta\theta = 0$$

$$\gamma(1-\beta) + \gamma\frac{\delta}{\alpha} = \beta\,\theta - r\,\delta/\alpha$$

where

$$\gamma = \frac{\beta\,\theta - r\,\delta/\alpha}{(1-\beta) + \delta/\alpha}$$

Tables V-9 and V-10 present the results of other simulations with the model. Table V-9 estimates growth rates of the public sector for pre-established values of β and r. Table V-10 calculates the percentage of educational investments necessary to satisfy the hypothesis that the size of the public sector remains constant. It should be noted that, in the previous estimate (*supra*), the maximum percentage of educational investments compatible with the hypothesis that *G/Y* remains constant, decreases rapidly (for the same growth rate) as investments increase as a result of the use of debt, which therefore increases the proportion of debt in tax revenue.[8]

In accordance with the foregoing estimates, when $\delta/\alpha = 0$—that is, if the debt is 0, and for a GNP growth rate of 5%—the relative share of educational investments in the total (γ) cannot exceed 20% if the size of the public sector is to remain constant. However, a rate of growth two times higher (10%) would only support an increase of close to 25% in the educational investment/total investment ratio if debt were used to finance the increase.

An important conclusion is that, for a given rate of economic growth, an increase in the percentages of investment (the budgetary restrictions being overcome by resorting to debt) would produce high rates of expansion of the public sector. A rate of educational investment corresponding to 10% of the tax revenue, for example ($\beta = 0.8$ and $\delta/\alpha = 0.3$ and $\gamma = 0.2$) would result in a growth of close to 10% in the size of the public sector, which would presuppose a doubling of the overall indices of government intervention in an interval of less than 10 years. Although these rates are not affected by the pre-existing situation, as regards the extent of government participation in the economy it is reasonable to assume that the possibility of an increase in the size of the government depends upon current levels of intervention. Doubling the coefficient of government in the economy in a decade is perhaps feasible if the initial indices are very low (around 10%, for example). Such a hypothesis could not be considered, however, for indices of around 20%.

The data from Table V-1 shows that, in most of the countries of the hemisphere, the traditional indicators of the size of the public sector have relatively low values when compared with international patterns. The average tax burden is around 15% and the average economic growth rate in the last decade was around 6% (3, p. 12). These values yielded the results presented in Table V-11 for public sector growth when different hypotheses regarding the coefficients of educational investment (assuming that $\beta = 0.8$ and $\gamma = 0.2$) are used.

Thus, although the size of the traditional public sector is relatively small, the growth caused by an expansion of educational investments can assume considerable proportions. According to the hypothesis that savings on current account are equal to 20% of tax revenue, an annual volume of investments of 1.2% of the GNP would produce an annual growth of about 5% in the expenditure/GNP ratio, that is, an increase of around 30% in the size of the public sector in a 5-year period (see Table V-11).

E. ADDITIONAL CONSIDERATIONS ON THE TAX SYSTEM AND THE FINANCING OF EDUCATIONAL EXPENDITURE

In the foregoing model, the financial constraint on an increase in public expenditure on social programs was basically determined by the growth rate of the GNP. However, although a higher level of income could represent an increase in the potential capacity to transfer private resources to the government by means of taxation (or other compulsory transfer mechanisms), the realization of this potential also depends on other factors. According to several studies on this subject, the taxation capacity of a country is affected by the size and growth of its population, the level of educational attainment, the degree of monetization and openness of the economy, the sectoral composition of production and distribution of personal income.

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[8] Since $\delta = D/Y$ and $\alpha = T/Y$, the δ/α ratio is equal to D/T, that is, to the debt/tax ratio.

Thus, taxation capacity would be better defined by income *per capita* than by total income, since a higher income *per capita* would produce a greater "surplus" (after deducting the essential subsidence costs), and therefore a greater taxation potential. For the same reason, two countries with the same income *per capita* differ theoretically in taxation capacity according to the levels of concentration in the distribution of the income, the country with the more concentrated income having a higher taxation potential.

Another important factor, especially in lower income countries, is the size of the external sector, since it is administratively simpler to collect taxes on foreign trade flows. For the same reason, the sectoral composition of production, represented primarily by the share of industrial production in the GNP, explains a significant portion of the differences in taxation capacity among countries of the same economic size.

The empirical findings of studies that attempt to measure taxation capacity and collection effort in various countries have usually shown low levels of tax effort in most of the Latin American countries in the recent past. For example, the data presented in the study by Chelliah *et al.* show that only two countries in the region (Brazil and Chile) have tax effort indices substantially higher than one, whereas in 13 other countries the indices obtained were equal to or less than one. Furthermore, these findings underwent practically no change in the second half of the sixties, since the indices calculated for the period 1969–1971 were very similar to those for the period 1966–1968 (see Table V-12).

Nevertheless, some changes may be noted in the tax structure. Data gathered by ECLA show an increase in the relative share of "direct taxes" in most of the countries of the region, probably as a result of successive recommendations in this regard by taxation specialists. In contrast, the share of taxes on foreign trade declined (except in Bolivia), while the findings for indirect taxes in general (excluding those on foreign trade) were more varied (see Table V-13).

Although it is not possible to establish a very clear relationship between changes in the taxation structure and changes in the tax effort indices, it is symptomatic that the countries that show the greatest increases in their tax effort indices (Costa Rica, Colombia, Paraguay and Honduras) are also those that show a substantial increase in the share of indirect taxes on domestic transactions in total tax revenue. Conversely, in the countries that showed an increase in the relative share of the income tax, those indices declined.

The usual recommendations about changes in the tax structure of the countries in the region should likewise be treated with caution. An increase in the relative share of the direct tax on income is not the inevitable result of a higher level of development nor is it necessarily the best way of improving the redistributive effect of government action. Low levels of development and high rates of income concentration entail a reduced direct income tax base and considerable difficulty in efficiently administering that tax. Furthermore, as a result of the growing importance of tax policy as a more general instrument of development policy, the grant of fiscal incentives for new investments significantly reduces the real progressivity of that type of tax.

The adaptation of the patterns of taxation in developing countries to those in developed countries could adversely affect financing capacity and the redistribution efforts of government activity. The reason is that the reduction in financing capacity limits the growth rate of social programs (education) and prevents access by less-favored segments of the population to higher levels of education and welfare. In addition, the apparent concern for equity in the tax system may limit a greater redistributive effect on fiscal policy on the expenditure side. As we have seen, the expansion of social programs generates increasing financial pressure on the public budget to the extent that it causes a significant increase in operating expenses. Given low levels of growth of tax revenue, the response to this type of pressure may include one or more of the following options:

1. A growing diversification of the forms of financing, including an increase in the share of extra-budgetary resources and a reduction in the proportion of the government budget in the total of the consolidated public sector.

2. A reduction in social expenditures, primarily those for investment, so as to reduce the effect of the growth in current expenditure on the budget.

3. A change in the way the production of services is organized, including a transfer to the private sector of a greater share of the responsibility for implementing social policies, the financing of which would depend more directly on the user himself.

Any one of these solutions could have undesirable results. Diversification of sources of financing and greater mobilization of resources through extra-budgetary channels make it difficult to adequately evaluate "trade-offs" in selecting alternative public policies and cause greater financial instability in the execution of government budgets. Since it is relatively easier to mobilize extra-budgetary resources for financing investment expenditures, the fear of future financial crises could influence decisions to use those resources and lead to their being channeled largely towards programs designed to expand the economic infrastructure whose subsequent operating cost requirements are limited.

On the other hand, the transfer of responsibility for the execution of social programs to the private sector, it being up to the user to finance operating costs directly, tends to increase inequality of opportunities. In the case of education, concern for the profitability of the investment causes private institutions to expand the number of places in low-cost courses, which is contrary to the real needs of the labor market. The higher cost, better quality courses offered by public schools in which tuition is free or subsidized by the government, are now attended by students from higher income families whereas the poor quality private courses for occupations in which the demand for professionals is small, and whose costs are paid *in toto* by the students, are attended mainly by students from lower income families.

It is important to point out that social inequalities in developing countries have deeper roots, which makes the problem quite different from that which developed countries face. The solution generally adopted by developed countries—progressive taxation and monetary transfers to less-favored minorities—is thus not the one that would best meet the purposes of eventually reducing the social inequalities that tend to accompany an increase in the growth rate. In developing countries, the redistributive effect of government action depends much more on the program of expenditures than on the structure of their financing. Since a low growth rate of tax revenue limits the possibilities of expanding social programs, the primary concern in the area of tax policy should be one of generating an adequate volume of financial resources and not of prematurely adapting the tax structure to the patterns of developed countries. If, in lower-income countries, indirect taxes (general or selective) on domestic transactions offer better prospects for channeling resources for financing government programs, this form of taxation should be given greater emphasis in analyzing financing options aimed at increasing the possibilities of expanding public programs of social interest.

F. SUMMARY AND CONCLUSIONS

An analysis of the overall indices of the tax burden suggests that the degree of government intervention in the economy is relatively small in most Latin American countries. According to the available data, the tax burden coefficients range from a minimum of 8% to a maximum of 20% of GNP, and are clearly related to income level, the size of the country, and the subregions of the continent.

This impression of a small public sector changes somewhat when the increasing decentralization in the execution of the government activities is taken into consideration. The proliferation of autonomous agencies, foundations, public enterprises and semi-public companies has been instrumental in diversifying the methods of mobilizing resources for financing production under government auspices and thus of reducing the importance of tax revenue and the "direct administration" in the consolidated budget of the public sector. It should be noted that, in the countries for which information was obtainable, the result of the consolidation of the public sector is that government participation in the economy is in the order of about one third of the GNP.

It is reasonable to assume that the higher the current level of intervention, the greater the resistance to the future growth of the public sector. In these circumstances, the expansion of social programs—including education programs—may be limited by the impact of this growth on the size of the public sector. We know that social programs are characterized by a high coefficient of growth in government current expenditures in the face of a given volume of investments. Therefore, an increase in the proportion of public investments for expanding education programs could entail a progressive reduction in investment capacity or in growth of the public sector.

The model used in this paper attempts to answer two questions: (1) What proportion of investments in education is compatible with the purpose of keeping constant the size of the public sector and its investment capacity? (2) What increase in size of the public sector is necessary to keep its investment capacity constant, given a certain goal for the share of educational investments in the total budget?

Since additional investments in education will require an equivalent amount of resources for the subsequent operation of the services, the calculations made indicate that the conditions the first question refers to would be met when the percentage of education investments (in relation to the total government investments) is equal to 4 times the growth rate of the GNP. That is, a percentage of public investments in education equal to 20% of the respective total would be compatible with an economic growth rate of 5%.

Later refinements show that this result is also affected by the financing structure, principally as regards the proportion of public debt in the financing of investments. For a given economic growth rate, much higher investment percentages (exceeding the budgetary constraints imposed by the public debt) would produce high rates of expansion of the public sector. A rate of education investments corresponding to 10% of the tax revenue, for example (considering 30% of the public investments financed through debt), would produce a growth of about 10% in the public sector, which if repeated annually would mean a two-fold increase in the overall indices of intervention in a period of less than ten years.

In short, the principal conclusion is that the financial constraint on an increase in public expenditures for social programs is basically determined by the growth rate of the product.

Some additional comments draw attention to the fact that the ability of the public sector to mobilize resources also depends on the tax pattern. To the extent that the concern to adjust the tax systems of developing countries to those used in developed countries would decrease the capacity to finance the expansion of social programs, the redistributive effect of fiscal policy on the expenditures side would be reduced, which would adversely affect the welfare levels of the least favored segments of the population.

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Table V-1. Latin America: Participation of the Public Sector in the Economy, Selected Years 1960–75
(Ratio of tax revenue to gross national product)
(Percentages)

	Source/Year						
	Lotz & Morss	Raja Chelliah et al		ECLA			IDB
Countries	Average 1963–65	Average 1966–68	Average 1969–71	1960	1970	1972	Average 1973–75
Argentina	20.1	13.3	13.4	14.0	15.2	11.2	4.6
Bolivia	—	8.7	8.2	7.9	9.2	7.5	11.7
Brazil	21.4	20.8	22.9	18.1	20.6	22.1	10.5
Chile	20.9	19.2	19.6	16.5	18.5	16.8	19.0
Colombia	10.9	10.6	12.5	9.7	11.8	11.1	8.1
Costa Rica	13.8	12.4	13.1	12.1	13.9	13.8	12.9
Dominican Republic	—	—	—	16.5	14.8	14.0	14.4
Ecuador	16.7	12.9	13.4	12.3	13.3	15.9	11.0
El Salvador	10.9	—	—	10.9	10.3	10.6	11.6
Guatemala	9.3	7.9	7.9	8.6	8.3	8.3	8.1
Haiti	9.[illegible]	—	—	7.8	6.0	5.9	8.6
Honduras	[illegible].9	10.5	11.3	10.7	11.9	11.0	11.4
Jamaica	15.6	16.7	19.4	—	—	—	19.2
Mexico	9.9	6.8	7.1	7.5	8.8	9.3	8.8
Nicaragua	13.5	—	—	10.4	9.8	9.9	10.7
Panama	15.1	—	—	10.1	12.3	12.0	11.3
Paraguay	10.2	9.7	10.9	8.6	10.4	8.3	8.4
Peru	16.0	13.7	14.2	13.0	15.4	14.9	13.6
Trinidad and Tobago	16.7	15.2	17.7	—	—	—	22.8
Uruguay	21.8	—	—	15.4	17.4	15.3	12.5
Venezuela	—	20.7	20.4	12.8	12.6	14.7	21.7
Latin America	—	—	—	**13.0**	**14.3**	**14.4**	—

Sources: Lotz, Jorgen R. and Elliot R. Morss. Measuring Tax Effort in Developing Countries. IMF Staff Paper, Vol. XII, No. 3, p. 479; Chelliah, R. et al. Tax Ratios and Tax Effort in Developing Countries. IMF Staff Papers, Vol. XXII, pp. 192–193; ECLA. Indicators of Economic and Social Development, 1976, p. 73; IDB, Annual Reports.

Table V-2. Latin America: Coefficients of the Tax Burden (Tax Revenue/GNP), Selected Years 1960–72
Regional Averages
(Percentages)

			ECLA	
Regions	Lotz and Morss 1963–65	Chelliah 1969–71	1960	1972
Latin America	14.5	14.1	13.0	14.4
Africa	15.7	19.2	—	—
Asia	14.4	15.1	—	—

Sources: See Table V-1.

Table V-3. Latin America: Product Elasticity of Tax System, Selected Years 1960–73

Country	1960–70	1971	1972	1973
Argentina	1.09	0.86	0.86	0.99
Barbados	—	—	—	—
Bolivia	1.16	0.89	0.91	—
Brazil	1.14	0.99	1.08	1.02
Chile	1.12	1.01	0.90	—
Colombia	1.22	1.00	0.94	—
Costa Rica	1.15	0.99	1.01	1.07
Cuba	—	—	—	—
Dominican Republic	0.90	1.01	0.93	0.93
Ecuador	1.08	1.17	1.03	—
El Salvador	0.94	1.01	1.02	1.08
Guatemala	0.97	1.01	0.99	0.95
Guyana	—	—	—	—
Haiti	0.77	1.00	0.98	—
Honduras	1.12	0.96	0.96	1.05
Jamaica	—	—	—	—
Mexico	1.17	1.02	1.03	1.03
Nicaragua	0.94	1.03	0.98	1.17
Panama	1.22	1.01	0.97	0.99
Paraguay	1.21	0.90	0.88	—
Peru	1.18	0.97	0.99	0.98
Trinidad and Tobago	—	—	—	—
Uruguay	1.13	1.01	0.87	—
Venezuela	0.98	1.21	0.96	1.12
Latin America	**1.10**	**1.00**	**1.01**	**1.04**

Source: ECLA. Indicators of Economic and Social Development in Latin America, 1976, p. 79.

Table V-4. Latin America: Central Government Expenditures as Percentage of Total Expenditures, Selected Years 1965–76

	1965–1967			1974–1976		
	Education	Health	Housing	Education	Health	Housing
Argentina	15.3	5.4	1.0	11.1	3.6	3.7
Bolivia	31.3	3.1	—	22.7	8.4	1.5
Brazil	7.2	3.0	—	11.6	4.7	0.8
Chile	20.1	2.0	22.3	12.3	5.9	3.1
Colombia	15.9	5.2	—	16.7	5.5	0.9
Costa Rica	29.8	10.1	—	31.5	5.6	0.3
Dominican Republic	14.0	7.8	—	9.9	4.8	5.8
Ecuador	15.1	5.9	0.1	15.1	4.1	—
El Salvador	25.2	13.1	2.2	22.6	11.8	10.2
Guatemala	14.3	8.8	1.0	16.4	12.1	0.5
Honduras	23.0	6.0	0.5	19.6	11.0	1.2
Mexico	14.3	7.7	—	7.9	3.2	—
Nicaragua	16.6	7.4	7.3	13.0	12.0	15.0
Panama	24.3	12.8	1.0	22.9	6.4	0.4
Paraguay	15.1	4.3	—	15.0	3.0	0.1
Peru	27.1	16.2	0.5	23.3	5.6	0.8
Venezuela	14.0	8.8	6.0	11.7	4.1	1.1

Source: IDB. Annual Reports.

Table V-5. Latin America: Structure of Public Expenditures of the Central Government, 1973–75
Percentage of the total

	Social programs				Transportation & communications	Administration & defense	Others
	Education	Health	Social security	Housing			
Chile (1974)	12.6	8.1	18.4	8.8	9.2	25.6	8.9
Costa Rica (1974)	33.3	5.4	5.1	4.3	18.9	16.0	15.3
Ecuador (1974)	24.2	7.5	1.9	—	16.0	32.3	17.7
Guatemala (1974)	17.3	8.3	6.0	9.8	10.9	28.9	12.8
Honduras (1974)	21.9	11.7	2.5	6.0	16.1	24.2	15.2
Mexico (1973)	16.2	4.9	20.0	—	12.4	13.0	24.6
Nicaragua (1975)	14.5	8.4	16.7	11.2	12.2	23.4	10.4
Panama (1975)	20.8	8.8	0.2	11.4	8.4	21.9	20.9
Paraguay (1974)	13.6	3.0	17.7	1.2	8.2	29.7	24.4
Peru (1974)	21.4	5.3	—	3.6	4.3	31.8	24.9
Uruguay (1974)	12.9	6.1	44.2	0.7	7.9	32.2	2.5

Source: IMF. Government Finance Statistics Yearbook, Vol. I, 1977.

Note: According to information from that Yearbook, the central government accounts for more than 80% of the tax revenue mobilized by all levels of government in the above-listed countries.

Table V-6. Percentage of Annual Increase in the Ratio of Expenditure to GNP for Different Values of γ and θ, Assuming That β is Constant and Equal to 0.8

	θ			
γ	0.03	0.05	0.07	0.1
0.2	1.9	0	—	—
0.3	4.4	2.4	—	—
0.4	6.8	4.8	2.8	0

Table V-7. Latin America: Current Expenditure of the Government as a Percentage of Gross National Product at Current Prices, 1960–72

Country	1960–1961	1969–1970	1970	1971	1972
Argentina	16.1	16.3	16.5	16.5	14.6
Barbados	—	—	—	—	—
Bolivia	14.2	15.2	15.9	16.4	16.9
Brazil	19.0	19.4	18.4	17.8	18.6
Chile	22.5	25.0	26.1	32.6	31.4
Colombia	7.6	10.7	11.3	12.8	12.0
Costa Rica	13.2	15.6	15.7	18.4	18.3
Cuba	—	—	—	—	—
Dominican Republic	14.2	14.1	13.6	13.4	12.3
Ecuador	17.5	20.0	20.1	22.2	20.8
El Salvador	11.5	11.5	11.8	11.6	11.7
Guatemala	8.6	9.3	9.4	9.2	9.3
Guyana	—	—	—	—	—
Haiti	9.9	9.8	9.9	10.6	10.7
Honduras	12.2	12.6	12.9	12.7	13.2
Jamaica	—	—	—	—	—
Mexico	9.8	11.9	12.1	13.0	13.7
Nicaragua	9.6	10.3	10.2	9.8	9.7
Panama	13.2	17.6	18.9	18.8	19.8
Paraguay	7.9	11.3	11.3	9.9	9.7
Peru	12.9	16.9	17.0	18.0	18.2
Trinidad and Tobago	—	—	—	—	—
Uruguay	23.5	27.0	27.0	30.8	23.9
Venezuela	15.5	15.7	16.0	16.5	16.4
Latin America	**14.9**	**15.9**	**15.9**	**16.5**	**16.4**

Source: ECLA. Indicators of Economic and Social Development in Latin America, 1976.

Table V-8. Percentage Increase in G/Y Assuming that I/G = 0.3 and r = 0.06

	$\theta = 0.05$			$\theta = 0.08$		
	β					
γ	0.8	0.9	1.0	0.[illegible]	0.9	1.0
0.2	4.4	5.2	5.9	1.5	2.3	2.9
0.4	12.6	13.4	14.0	9.5	10.2	10.9

Table V-9. Percentage Increase in the G/Y Ratio for $\beta = 0.08$ and r = 0.06

	$\theta = 0.05$	$\theta = 0.08$		
	γ			
δ/α	0.2	0.4	0.2	0.4
0.1	3.1	10.2	0.2	7.2
0.2	6.2	15.7	3.2	12.5
0.3	9.3	21.2	6.3	17.8

Table V-10. Percentage of Educational Investments (γ) Compatible with the Hypothesis in Which the Size of the Public Sector (G/Y) Remains Constant for β = 0.8 and r = 0.06

	[illegible]		
δ/α	0.05	0.08	0.1
0	20.0	—	—
0.1	11.3	19.3	24.7
0.2	7.0	13.0	17.0
0.3	0.4	9.2	12.4

Table V-11. Percentage Growth of the Public Sector for Various Coefficients of Educational Investments

Coefficient of educational investments to GDP	Growth rate of the public expenditures/GNP ratio
0.007	0.08
0.009	2.1
0.012	5.2
0.015	8.3

Table V-12. Latin America: Indices of Tax Effort, 1966-71

Country	1966-68	1969-71
Brazil	1.779	1.806
Chile	1.176	1.159
Argentina	1.098	0.973
Jamaica	1.031	1.034
Ecuador	0.978	1.002
Costa Rica	0.813	0.970
Venezuela	0.971	0.958
Peru	0.923	0.874
Colombia	0.803	0.901
Paraguay	0.801	0.867
Mexico	0.771	0.490
Honduras	0.752	0.80[illegible]
Trinidad and Tobago	0.701	0.834
Guatemala	0.647	0.618
Bolivia	0.536	0.459

Source: Chelliah, R. et al. Tax Ratios and Tax Effort in Developing Countries. IMF Staff Papers, Vol. XXII, pp. 192-193.

Table V-13. Latin America: Modifications in the Taxation Structure, 1960–1972

	Receipts from the major taxes as a percentage of total tax revenue								
	Direct taxes			Indirect taxes on domestic transfers			Taxes on foreign trade		
Countries	1960	1970	1972	1960	1970	1972	1960	1970	1972
Argentina	23.3	22.0	16.4	53.2	65.9	65.4	23.5	12.1	18.2
Bolivia	12.7	14.5	19.0	48.5	28.4	37.2	38.8	57.1	43.8
Brazil	20.0	24.4	31.9	75.6	72.5	64.7	4.4	3.1	3.3
Chile	38.6	35.1	29.8	41.4	53.0	60.5	20.0	11.9	9.7
Colombia	51.4	47.5	45.5	22.8	30.8	35.0	25.8	21.2	19.5
Costa Rica	16.0	23.2	25.5	20.5	42.6	50.9	63.5	34.2	23.6
Dominican Republic	23.7	30.1	31.2	38.1	21.9	20.6	38.1	48.0	48.2
Ecuador	14.7	20.9	28.6	38.2	29.4	33.0	47.1	49.7	38.4
El Salvador	12.5	24.6	24.8	25.4	32.4	36.3	62.1	43.0	38.9
Guatemala	9.2	17.6	19.3	45.0	53.3	53.8	45.8	29.1	26.9
Haiti	8.8	11.7	11.9	26.8	33.0	35.5	64.4	55.3	52.6
Honduras	17.3	28.5	25.9	31.1	41.7	42.1	51.6	29.8	32.0
Mexico	34.3	45.8	46.8	43.4	43.3	44.5	22.3	10.8	8.7
Nicaragua	12.0	19.4	20.6	31.0	50.6	52.9	56.8	30.0	26.5
Panama	32.6	48.1	44.8	18.1	22.6	22.6	49.3	29.1	27.6
Paraguay	17.2	17.5	20.1	17.3	36.2	40.7	65.5	46.3	39.2
Peru	38.1	36.0	35.3	39.1	39.4	43.7	22.8	24.6	21.0
Uruguay	21.4	15.0	13.8	51.3	72.9	74.6	27.4	12.1	11.6
Venezuela	56.5	70.4	76.1	17.9	18.9	15.7	26.6	10.7	8.2
Latin America	**29.6**	**37.6**	**34.7**	**49.4**	**52.6**	**51.3**	**21.1**	**12.8**	**12.5**

Source: ECLA. Indicators of Economic and Social Development in Latin America, 1976.

CHAPTER VI

Public and Private Financing of Education in Latin America: A Review of its Principal Sources

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INTRODUCTION

For the countries of Latin America and for the world in general, the 70's have proved to be a decade full of uncertainty and disequilibria, which have taken the form of continuous fluctuations in the level of economic activity, the level of employment, the inflation rate, the balance of payments, the fiscal deficit, etc. These economic tensions have been accompanied by social tensions that have usually been associated not only with the above-mentioned disequilibria, but also with unsatisfied demands for social services provided by governments.

In this restive setting, the governments of Latin America have had to face rising pressures to provide "more and better" education. These pressures have generated great concern in governments, which is reflected in a search for urgent answers to very difficult questions. One of these questions might be summarized as follows: if the trends of educational enrollment observed in the 60's and 70's continue in the coming years, will the governments be able to finance these growing educational demands, particularly if they are accompanied by rising demands for other public social services? Or, on the contrary, are we on the threshold of a profound crisis in the financing of education that can make us adjust not only our quantitative targets for access to education, but also our goals for the qualitative improvement of educational services?

The critical reappraisal of the present state and future role of education is in significant contrast to the expansive euphoria of the 50's and 60's. This contrast between the earlier euphoria and the present-day caution in wide social and political circles of Latin America invites reflection on what lies ahead for education in Latin America. There is no better way of beginning our analysis than by drawing a quantitative picture of future student enrollment and the financial requirements of the public and private sectors. This will provide an appropriate empirical context for the "optimists" and "pessimists" in the educational area and furnish a very useful frame of reference for an analysis of the possibilities emerging in Latin America for the generation of additional funds with which to sustain the expansion of education. This will be the subject of the first section.

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Following the analysis in section A, based on the projections of the demand for education in 1980 and 1985, this paper will endeavor to reexamine, in the following sections, the principal sources of public and private financing for education. Only financial resources directly associated with education will be considered; this means that the analysis will disregard the tax revenues that feed the government's general budget, which in turn constitutes the principal source of financing for education.

The concept of financing embraces the two faces of a single coin: total costs and income. This brings us to the second exclusion from our purview: the factors that can bring about a reduction in costs per student and/or changes in the mix of educational levels with different unit costs.

This review places special emphasis on the salient conclusions of the seminar on the same subject held at IDB headquarters in Washington in November 1976.

A. EVALUATION OF THE FINANCIAL REQUIREMENTS OF THE EDUCATIONAL SYSTEM FOR 1980 AND 1985

The analysis of the various possible methods of financing education will begin with a review of two recent studies made for Latin America on the financial requirements for attaining certain enrollment goals in 1980 and 1985. Our analysis will present the conclusions of the studies made by Dagnino Pastore (4) and Munoz Izquierdo (21). This analysis is highly interesting in itself because the two authors made their projections by different methods.

Dagnino Pastore's projection model was based on an estimation of the demographic growth and age structure of each Latin American country in 1980 and 1985. Then, on the basis of a hypothesis for the enrollment ratios of every age cohort at each education level, he estimated the total number of students that would be educated at each education level. Finally, on the basis of historical data on the cost (current and capital) per student at each education level, he determined the total cost of education (discriminating between public and private education). These values were in turn related to hypotheses about the growth of the government budget and the gross national product (GNP) for 1980 and 1985.

Munoz Izquierdo, on the other hand, has constructed a model that econometrically relates the demand for education to the social structure of the country in question.[2] This model estimates the demand for education on the basis of the coverage of the formal education system (measured by the gross enrollment ratios at the various levels of education). The set of independent variables that measure the social structure of the country is broken down into one subset of variables reflecting the population and living conditions in the country (birth rate, *per capita* energy consumption); another subset that measures the participation of the economically active population by sex; and a third subset that measures the participation and the growth rate of the urban population in the total population. The equations that yield the best statistical estimate of the demand for education at each level are selected from this group of equations, after which enrollments at the different levels in 1980 and 1985 are estimated (with upper and lower limits) on the basis of exogenous projections of the independent variables for the selected equations. Having determined the number of students, the model follows a method similar to Dagnino Pastore's: historical values of the cost per student at each level (assuming, as Dagnino Pastore did, that the cost at each level is the same for public and private schools) were used to estimate the total cost of education in 1980 and 1985. Finally, the total cost of education was related to total public expenditures and the GNP on the basis of projections of these two variables (two hypotheses were used: one of slow GNP growth and the other, of rapid GNP growth).

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[2] Although Munoz Izquierdo's projections go to 1990, we have only taken the estimates for 1980 and 1985 because of our interest in comparing them with those of Dagnino Pastore.

Of course, the quantitative projections made must differ, not only because the two models use different methods, but also because the definition and measurement of the variables differ.

Nevertheless, it is worthwhile presenting the principal conclusions of these two models because, while their empirical results may differ in terms of absolute values, their trends to 1980 and 1985 may be useful in answering the question of whether in the years ahead the financial efforts the governments and the countries as a whole have to make in education will be greater than those they have so far made.

The principal variables that will enable us to answer this question are summarized in Tables VI-1 and VI-2. Table VI-1 gives the gross enrollment ratios by levels as predicted by the two models. The second table then determines the financial effort of the governments through the ratio of government expenditure on education to total public expenditure and the total national effort through the ratio of public and private expenditure on education to the GNP.

The results of Table VI-1 confirm the previous assertion that the absolute levels (in this case enrollment ratios) are quite different in the two models. With regard to the trends up to 1985, however, both models project a substantial growth in enrollment ratios. One point worth emphasizing is that, whereas for Dagnino Pastore the greatest growth will take place at the higher level, for Munoz Izquierdo the emphasis, and therefore, the greatest expansion, will center on the secondary level of education. Therefore, on the basis of these different strategies of educational expansion, the question whether the financial effort will be greater in the one or the other case immediately arises.

Table VI-2 attempts to answer this question. For Dagnino Pastore the financial effort peaks in 1980 and then drops slightly by 1985. The Munoz Izquierdo model, based on a different educational strategy, predicts the same behavior.[3] Although the above-mentioned limitations must be fully taken into account, this coincidence between their results constitutes a serious warning to those who predict an explosive growth of education costs and hence a crisis in financing. Moreover, these projections provide a better context for questions about the future. The question in this case is not whether reasonable enrollment goals will or will not be financially feasible since, according to these models, they are. On the contrary, our future concern must be oriented toward outlining a financing strategy that is compatible with the objectives of efficiency and equity in access to education. Accordingly, our main interest in the rest of this paper will center on the interrelationships between financing, efficiency, and distributive equity.

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[3] Of course, these results are valid for Latin America as a whole; for certain countries in particular, the financial requirements for 1985 are greater than those projected for 1980.

B. FINANCING OF EDUCATION: EFFICIENCY AND EQUITY

In a market economy the price system assures optimum allocation of resources to the extent that certain very strict rules of the game are obeyed. If they are not, as when there are institutional barriers to entry into a productive activity or indivisible production factors with decreasing costs or external economies or diseconomies, the resultant allocation of resources deviates from that which takes place under conditions of perfect competition. The occurrence of these "exceptions" to the rules of competition has led to the present reality, of countries with mixed economies in which government intervention is designed to ensure that resources are optimally allocated from both the private and social standpoints.

This is why economic analysis usually distinguishes public from private goods. The former, in Musgrave's approach, characteristically meet a demand in which the benefits of one person from his consumption are not affected by the consumption of another person. The benefits associated with the supply of these public goods are received by all members of society, independently of the individual's contribution to their financing. In other words, the fact that a person makes no payment for a public service does not exclude him from the service supplied. Consequently, the demand for public goods cannot be supplied by the market because, since it is impossible to quantify the preferences of the individual consumers, there is no way of setting a price they would voluntarily pay for them. Since these goods have no "price," the provision of the public good or service is paid for or financed out of the tax revenues in the government budget.

Private goods, on the other hand, are traded on the market at prices that operate as indicators of the direct benefit obtained by the buyer and seller. These private goods may be produced by the government or by private enterprises, as exemplified by iron and steel production in several Latin American countries. Consequently, the distinction between a public and a private good does not depend on whether it is produced in the public or the private sector, but on whether or not a price can be fixed that measures the private and social benefits obtained from its use.

Can we classify the provision of educational service in one of these two categories? Obviously, we cannot say that education is strictly a public good, for its use yields benefits not only to society but also to the direct user since education provides him with a higher income in the future. For this reason, education is defined as a semi-public good, which indicates that, on the one hand, the market can assign a price to it on the basis of the expected rate of return and, on the other hand, that this market price may not reflect the benefits accruing to society. In other words—from the social standpoint—the purpose of government intervention is to correct the decision of individual buyers in order to improve the allocation of resources to education from a social point of view.

This government intervention takes the form of a subsidy to the cost of education, which can cover all or part of that cost. In other words, education can have a market "price" that is paid by the consumers of the service and varies with the direct benefit or profit obtained, but since this "price" cannot reflect the benefits accruing to society as a whole from its consumption, the government intervenes to finance it through subsidies so as to ensure that the investment in education is compatible with an optimum allocation of resources. Since it is virtually impossible to measure the social benefits from the external economies, where the private contribution should end and where the public financing of education should begin cannot be accurately determined. Because of this, the actual mix of government subsidy and private contribution reflects the interventionist tradition of the country and its preferences and scale of social values.

Consequently, the costs of education—regardless of whether the service is provided by the government or by the private sector—are paid by the students or their families and by the government or the taxpayers.

The foregoing considerations justify, on grounds of productive efficiency, public and private participation in the financing of education. But this is not the only reason for government intervention. There is also the fact that—given the existing inequalities in income distribution—if people had to pay the entire cost of education in order to obtain it, the opportunities for education would be greater for the high-income groups. This allocation of resources runs counter to the general principle that access to the educational system should be independent of the individual's income level, since in a modern society every individual has the right and the duty to acquire a certain level of schooling. Consequently, it is argued that the public subsidy to education should be provided in inverse relation to the income level. To the extent that the public subsidy benefits low-income groups, and high-income groups pay the total cost of their education, distributive purposes are furthered because the latter are not only paying for themselves, but are also helping, through the tax system, to finance the education of low-income groups. The greatest difficulty in this rule of social equity lies in determining what constitutes an appropriate income distribution. This decision must be a political decision of the members of the social community.

Resting on principles of efficiency and equity, the previous considerations justify concurrent contributions to the financing of education by the direct consumer of the service and by the government through public subsidies. These considerations are independent, however, of whether education is to be provided in public or private schools. To say that the government must satisfy the educational demand does not imply that the service must be produced by government alone, for it can also be provided by the private sector. The statement only means that the service is financed out of government funds. To the extent that education is supplied by both types of institution, the analysis is further complicated by a series of considerations associated with the socio-economic origins of the groups that usually attend public and private establishments, with differences in the "quality" of the educational service, etc.

These considerations show that the political decision associated with the mix of public and private financing for education has three aspects that merit special consideration: the impact of this mix on the efficient allocation of resources, equitable income distribution and, finally, the specific problems associated with providing education through public and private schools. These aspects will be borne in mind in our more detailed analysis of public and private financing of education.

C. PRIVATE FINANCING OF EDUCATION

The analysis of the private contribution will focus on two aspects: (i) the various ways in which the private sector contributes to the financing of education, and (ii) the role and implications of the provision of education by private schools.

The first aspect can be usefully addressed by emphasizing the various forms that private financing of education can take:

a. the income forgone by the student's family while he is studying instead of working;

b. the financing by the families of certain expenses associated with school attendance, even if such education is entirely free of charge. Included here are expenses for books, transportation, etc.

c. the payment of fees.

d. the family contribution made in certain, especially rural, communities. This contribution can take different forms such as the voluntary and unpaid provision of educational services, the production of certain goods whose sale helps defray school costs, the construction of school buildings, etc.

The sections that follow will look more closely at each one of these sources of private financing for education.

1. Income forgone

One of the most significant contributions made by a family to the financing of education is the income forgone while one of its members is attending secondary school or a university (because of the compulsory nature of primary education, the income forgone at that level is zero). This is not merely an individual sacrifice but a social one as well, in that society as a whole must do without the goods and services that would have been produced while the student remains in the educational system.

Estimating the income forgone poses major conceptual and empirical problems. As a rule, it is not enough to know how much an individual of the same age and with the same schooling as the student is earning (which is in itself a serious empirical problem); it is also necessary to introduce assumptions about the effect of the marginal hiring of that student on the market wage level. No major estimation problem arises if only one student is to be hired. However, an aggregate estimation that embraces a sizable number of students in the educational system complicates the analysis considerably, since heroic assumptions have to be adopted on the effects of hiring them on the labor supply and, consequently, on wages. Of course, to gauge the extent to which the market wage reflects the social cost, additional assumptions would also have to be introduced about the competitive character of the labor market and the unemployment level.

Studies aimed at quantifying income forgone in Latin America are almost totally nonexistent. Studies that relate income forgone to the cost of education are available only for some countries. It is estimated for Brazil (16) that, if the income forgone is half the minimum wage, its relation to the direct costs of public education would be, in the case of the "ginasio," about 2.3 times higher than the cost in the work-oriented "ginasio." In secondary education, if the income forgone is equal to the minimum wage, its value would be twice the direct cost of academic instruction and barely four-fifths of the cost of technical education.

Estimates in this direction have also been made for technical and secondary schools in Argentina (7). In these estimates, the income forgone varies with the percentage by which wages fall as students enter the labor market. In the case of technical education, if wages remain unchanged, the income forgone is 120% higher than the direct cost per student/year in technical schools. On the other hand, if wages fall 40% following entry into the labor market, the income forgone falls to 74% of the cost of that schooling. For secondary education the results are less significant because the average wage of an individual with this level of schooling is lower than that of a person who has received a technical education. In this case, the income foregone ranges between 88% and 53% of the cost per student/year in secondary schools if wages remain constant or drop 40%, respectively, after entry into the labor market.

These results show that free public education is not a necessary and sufficient condition for ensuring access to education for low-income groups. Income forgone is usually an important limiting factor in the educational decisions of broad segments of society. It must be kept in mind, however, that if the government decides to finance the income forgone by post-primary school students, the final result may be—with limited fiscal revenues—fewer resources for primary education and, probably, less distributive equity.

2. The family contribution to the financing of education

As was said above, in considering the financing of education, the existing mixes of government and private contributions for covering the cost of education are usually reviewed, and private costs are defined to include not only fees, but also the income forgone during the period of schooling. For lack of statistical data, this kind of analysis cannot consider certain expenses incidental to schooling, such as school supplies and textbooks, transportation, etc.

In such cases the question of the magnitude of these incidental expenses immediately arises, because even in a setting of free public education they can be so high as to make the cost of access to the free education system prohibitive for low-income groups. An ECIEL study (19) yielded the information summarized in Table VI-3 on student expenses for school supplies, uniforms or clothing, meals, transportation, etc., as percentages of the total cost per student/year.

As may be seen from this table, these expenses vary widely from country to country. For public schools, they represent 17 to 20% of the total cost/student in Argentina, 4 to 11% in Mexico, 18 to 24% in Paraguay, and 29 to 35% in Ecuador.

Table VI-3 presents these incidental expenses as percentages of the total cost per student, but how large are they (including, moreover, fees for extramural classes—for example, in music, art, etc.) in relation to the family income? Statistics are fortunately available on the magnitude of these expenses relative to total family expenses by income level in several major cities of Latin America. These data were obtained from family income and consumption surveys carried out by ECIEL in the second half of the sixties.

Musgrove's study (22) presents statistical figures on the levels of expenditure on education of urban families in 11 cities of 6 countries in Latin America.[4] These costs are classified in terms of factors relating to family makeup (age of the head of household, life cycle, number of family members and number of children in the family) and to income (income bracket, educational level, occupation, employment, and property holdings).

The following conclusions may be drawn from this study:

a. Expenditure on education averages between 1.08 and 5.90% of total family expenditure. Since the surveys did not determine the number of family members attending school or the percentage of families that had members attending school, it is quite possible that these percentages may be much higher for families with members attending school.

b. Family expenditure on education rises faster than income or total expenditure.[5] The income-elasticity coefficient ranges between 1.3 and 2.3. This faster increase in expenditure on education than in income may be due to the fact that, as the family income increases, more children can be sent to school, or because the family is spending more for non-formal academic instruction (languages, art, music, technical skills such as typing, etc.). Therefore, as income rises, not only does the formal education of the family group increase, but the "quality" of the education is also improved by this expenditure on non-formal education.

c. At any given level of family income, when the head of the family is uneducated, his family spends less on education than if he has had some schooling.[6] These findings corroborate the well-known assertion that the opportunities for formal education are greater for children whose parents have attained a certain level of education; that is, the children of uneducated parents remain "confined" in the same category as their parents.

In short, the great-than-unity income elasticity of family expenditure on education shows that access to education for low-income groups can be hindered, even if education is free of charge, not only by the income forgone but also by the burden on the family group of financing certain expenses associated with attending school. Thus, the principle of equality of opportunity can be severely restricted if government student-aid programs do not provide for expenses of this kind.

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[4] As defined, educational expenditure does not include general cultural expenses, the purchase of non-academic books and magazines, or the cost of school uniforms.

[5] A similar conclusion may be drawn from (26). That study compares the income elasticities of private expenditure on education in 10 countries of Asia, Africa, and Latin America. The elasticity is found to be greater than unity in all these cases.

[6] While a higher level of schooling of the head of the family also results in a higher permanent income, the association made in the text indicates that a high-income family with an uneducated family head may spend less on education than a low-income family whose head has had some schooling.

3. Contribution of local communities to the financing of education

A more recent kind of private contribution to the financing of education is associated with the philosophy of self-development. This approach is based on the promotion of local schools financed out of contributions from the members of the community in a kind of cooperative action. Underlying this philosophy is the principle that the very nature of formal education hinders its extension to rural areas and does not satisfactorily solve the dropout problem. As a result, local communities are obliged to design flexible programs that make education more accessible to the population.

Swett's interesting study (28) examines this topic in greater detail in the light of experiences in Honduras, Colombia, Brazil and Costa Rica.[7]

The formal education system is the typical model for rural education in Latin America. Because of the limitations of this model in output and quality of the educational service, other arrangements for providing education have emerged in the last few years and are designed to bring in new funds and improve the quality of the education provided. In general, analysis of these experiences indicates that extramural rural education elicits more active user participation in its financing than formal education does. This financing can take the form of direct cash contributions by users or the unpaid services of educational volunteers.

The actual experience of several countries shows that a basic prerequisite for the success of these "voluntary programs" is the creation of the necessary conditions for motivating the community group to participate effectively in such an educational program. An important step toward securing this community contribution is to revise the educational service and to emphasize practical instruction (for example, agricultural production practices) as opposed to more academic subjects. A side effect of this shift in rural educational service is to facilitate the creation of new sources of financing in the community itself.

An *ex-post* evaluation of educational projects carried out in Trinidad and Tobago, the Dominican Republic, Panama, Honduras and Cuba (9) indicates that: a) between 25 and 50% of the operating and maintenance costs of a school can be financed by the sale of goods produced in the school (net of production costs); b) between 15 and 30% of the operating and maintenance costs can be financed with community inputs; c) between 15 and 30% of the capital investment in the school can be financed with community inputs (9).

The Honduran program of central/satellite schools, launched in 1973, is an interesting example of a new educational arrangement. The aim of this program was to cover 40% of the total primary school enrollment by 1977. Attainment of this goal obviously called for more physical and human resources, which could be financed only if a greater contribution was obtained from the beneficiary communities. Therefore, a basic determinant of the success of this program was to instill into the community a powerful mystique of cooperation and joint effort. The central idea of this scheme was the "self-help" principle, which enabled funds to be raised and communities motivated to cooperate in building schools. The benefits deriving from this Honduran model must be appraised in terms not only of its contribution to self-financing, but also of the increased efficiency of the system. The retention rate in the satellite schools is 50%, compared with 21% in the regular rural schools.

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[7] Swett's study actually covers more than just the community contribution; it also analyzes rural basic, formal and non-formal or extramural education.

A different approach, but one that also centers on community motivation and participation, is the Colombian program of non-formal education. This program is aimed at groups that are completely outside the economic and social mainstream: 73.4% of the participants have had no access to primary education and 80.6% of the total are between 20 and 39 years of age. The government contributes 32% and the users, 33% of the total cost, the users contribution being much higher in rural areas than in urban areas. One noteworthy feature of the program is that volunteers (both part- and full-time) outnumber paid personnel.

Despite these advantages and the accelerated growth of extramural programs, their current coverage in rural areas is fairly limited: aggregate expenditures for extramural education amount to about 25 to 40% of the expenditures budgeted for the primary level. The population and spread of new rural education models will generate a rising demand for financing because of social pressures to increase the number of students and of an increase in unit costs.

The growth of rural education will cause total costs to rise more rapidly because of an increase in costs per student/year, which in the new non-formal rural models of education can be at least 20 to 30% (5). This increase in costs per student/year stems from the following factors: a) the increased provision of improved school materials, particularly printed matter, b) the requirement that teachers be better trained and work longer hours, which implies higher wages, c) improvement and expansion of the physical facilities of the school, d) the provision of additional central services (for example, coordination and supervision). Danière (5) concludes that we must assume that the financial requirements for developing new programs of rural education will vary in direct proportion to the desired levels of school production.

In Honduras the impact of an increase in the unit cost and of the increased student retention made possible by the central/satellite school program has meant an 80% increase in total costs.

All this suggests that a program of rural education with ambitious quantitative and qualitative goals cannot rely solely on local financial contributions. The government cannot stand financially aloof from such programs. The experience of MOBRAL in Brazil confirms the principle that an extramural mass literacy program can be implemented only if substantial government funds are provided. Of the financial resources of MOBRAL 95% are derived from the sports lottery receipts and income tax revenues; this made it possible to undertake a literacy program that benefited 17 million people in the period 1970-74. While the program does not actually exclude a community contribution, it limits it to motivating the community to provide logistic support and to participate in benefit events such as fairs, raffles, etc.

In short, the development of new non-formal educational models, which diverge from the traditional rigidity that characterizes formal education, augurs well for the financing and quality of the educational product to the extent that such development is associated with greater motivation of the community. A more active community can make it easier to attract local resources and obtain the provision of community services, and thus help meet the financial requirements associated with a higher demand for education. But existing pressures to move ahead faster with rural and adult training programs, and the higher unit costs that such programs may entail, indicate that the effort involved is beyond the capabilities of the local community. Of course, a highly motivated community can facilitate and minimize the total cost of a program, but there is no doubt that in the future governments will have to contribute more substantially to the financing of formal and non-formal rural educational programs.

Another factor to be borne in mind in promoting community development policies is the very uneven socio-eonomic levels in the various areas or regions of a country. It is generally recognized that very poor communities place a much lower social value on a good education than more prosperous areas do. Consequently, the greater voluntary support provided in prosperous communities results in better teachers, better equipped schools, and more suitable buildings. All this tends to create and accentuate differences between schools according to the relative development of the communities. Because of this, an educational policy that relies solely on voluntary contributions by the communities themselves can yield unwanted results as regards regional equity to the extent that these contributions are closely associated with the economic and cultural levels of the communities. In these cases it is far better to rely on schemes based on complete funding by the central government itself.

4. Private education establishments and their role

Up to this point the analysis has focused on three aspects of the private contribution to the financing of education: income forgone, family expenses for books, transportation, etc., and the contribution of the local community. Still to be considered is the financing arising from the payment of fees that cover all or part of the cost associated with education, and of the construction and maintenance of school buildings.

This subject is closely bound up with the provision of education by public and private establishments because, as a general rule, no fees are charged in the former, whereas, in the latter, fee income is supposed to constitute the primary source of financing. Hence, to analyze education in private schools it is necessary to know who receives and who pays for it. Accordingly, this analysis must first consider the socio-economic characteristics of the recipients of private education, and then move on to an analysis of those who finance it.

a. Socio-economic characteristics of students in private schools

Table VI-4 summarizes the trend and percentage enrollment, by level, of private education in selected Latin American countries. The column for the ratio of the growth rate of private to public education at each level shows that in the last few years enrollments in private establishments have lagged behind those of government schools.[8] Colombia is the country in which private education not only grew faster than public (except at the secondary level), but also had the highest enrollment ratios: about 50% of the student population in 1974 attended private schools. On the whole, it could be inferred from Table VI-4 that the higher the educational level, the higher the enrollment in private institutions.

On the basis of an analysis of five countries in Latin America, Silvan Lourie (15) attempted to determine the level of education at which a high proportion of paid private education constitutes a socially selective "filter" that effectively deprives low-income students of real access to higher levels of education.

In all the cases considered, the proportion of free public education at the primary level is very high (about 85%). At the secondary level, the proportion of private education exceeds 15% in all the cases considered. At the higher level, this proportion is higher than 15% in some countries and lower in others. These findings suggest that the socially selective "filter" is located at the secondary level of education. The filtering effect of the higher level is less clear-cut, since it varies with the particular situation in each Latin American country.

This conclusion that the process of selection by social stratum has already taken place at the stages prior to admission to the university level, now viewed in a broader context that takes in not only private but also public education, is also confirmed for Costa Rica, a country whose social and educational structure is much more diversified than that of most Latin American countries. "The educational process prior to the higher level actually exerts a dual homogenizing effect. On the one hand, the selection process in secondary education tends to reduce the proportion of the lower social strata; on the other hand, the members of these lower strata that do complete secondary education are, in a statistical sense, a sample of the best people in those strata." Hence, "the considerable efforts that Costa Rica has been making to provide equal opportunity for secondary education must be continued because it is there that they can be of decisive importance in attaining that purpose." (10, page 13).

These findings suggest that the variations in social selectivity observed among the countries of Latin America are ultimately a reflection of different social structures and policies of social participation. Thus, in Colombia the high degree of social selectivity at the secondary level continue into the higher, university level, where the enrollment in private institutions is as high as 51.6%.[9] This case contrasts with that of Mexico, where the low proportion at the secondary level is continued into the higher level.

The considerations put forward so far should be taken with some caution because they start from the assumption that students attending private schools are a homogeneous group originating from the highest levels of society. The

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[8] This column shows the extent to which the annual growth rate of private education exceeded or fell short of that of public education. In Bolivia, for example, at the primary level, private education grew 66% faster than public education, whereas in Venezuela the public annual growth was 54% faster than the private.

[9] At the secondary level, 65% of the students from the lowest income group in Colombia attend public schools and the remaining 36% attend private schools. In the highest income group, on the other hand, only 17% attend public schools and the remaining 83% attend private schools (12, p. 34).

Munoz Izquierdo-Hernandez study (20) relativizes this widespread interpretation to some extent by calling attention to the diversity of the institutions that make up the private sector. In four of the five countries considered by these authors the students from the higher and lower strata[10] were equally distributed among private schools. These findings suggest that in several countries of Latin America it is not appropriate to view private education as a monolithic structure serving only the high-income levels; rather it must be viewed as a heterogeneous and differentiated system because it is attended by students of diverse socio-economic origins.

b. Private education and its financing

Moreover, all those considerations about the elitist implications of access to private education must be approached with the utmost caution because, to obtain an overview, we should also take into account how that education is financed. This is an important distinction because the government could correct observed regressive tendencies in the socio-economic level of entrants to private schools through a policy of subsidies and scholarships from the lower strata.

Here we must bear in mind that, if private schools were to charge their students for the entire cost of their education, the impact on income distribution would in principle be neutral because the students from the higher income strata would pay for their own education. We say that the impact would be neutral in principle because, though the cost of private education for the higher strata would be higher than that of free public education, the difference could be more than offset by the higher future income of graduates of private schools. This difference in incomes can spring either from a difference in the quality of education or from the different market value placed on the graduates of the two kinds of institutions.

Going back to the sources of financing of private schools, the Munoz Izquierdo-Hernandez study shows that the share of fee income in total income varies from country to country and from one educational level to another in the same country. In general, this source of financing does not cover the entire cost of education,[11] and is therefore supplemented by private endowments[12] and direct government subsidies.

On the basis of the findings of a 1975 survey of a group of private schools, it was estimated that in Argentina the government subsidy ranged between 45% and 92% of the operating cost per student at the primary level and between 31% and 96% at the secondary level. The difference between this operating cost and the government subsidy was covered by fees (7, p. 60). This situation is completely reversed in Ecuador, where fees provide 87% and government subsidies, a mere 3.3%, of the income of private primary schools (which account for 11% of the primary-level enrollment) (29, p. 35).

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[10] Of course, it would have been interesting in this case to make a comparative analysis of the socio-economic level of students in private and public schools instead of looking only at the internal structure of private establishments. Unfortunately, work in this direction is impeded by a lack of statistical data.

[11] In Colombia, where more than 50% of the university level students are in private institutions, fees account for 62% of the income of private universities (12, p. 10).

[12] In Bolivia, the only Latin American country where the share of private endowments (domestic and foreign) could be quantified, this source supplies 11% of the income of private schools (20).

Because of the constraints on private establishments in their efforts to cover all the costs of their education through fees, and because of the difficulty of gaining access to other sources of financing, private schools are in the throes of a financial crisis, as can be seen from the gradual decline in their capital investments.[13] The "financial crisis" is less critical for private schools attended by students from the high-income groups, which can even operate at a surplus. This is precisely the case of private institutions—generally on the university level—that more directly meet the needs of the private sector either because of the socio-economic origin of their students or because of the "quality" of their educational product. Examples of this approach are the Monclova School of Mechanical and Electrical Engineering and the Technological University of Mexico, where fee income covers almost all the operating costs.

In general, however, this is not the usual situation in private education, which is actually growing increasingly dependent on public subsidies, as was noted earlier for Argentina. Hence, if access to private schools is restricted to the high-income strata and the public sector finds itself obliged to help finance their deficits, such government financing impairs the principle of distributive equity. For this reason, increasing weight is being given in Latin America to the argument that public subsidies to private schools must go hand in hand with greater "democratization" of admissions. The vigorous growth of the "Fe y Alegria" (Faith and Joy) schools organized by Catholic groups and intended chiefly for children in marginal urban districts, is an important example of an educational arrangement that reconciles public subsidy with distributive equity (in Colombia the subsidy covers 85% of the wages of teachers and, in Bolivia, operating expenses are financed by the government and capital expenses by the local communities and the Catholic Church). Moreover, the new legislation in Colombia (1974) and Venezuela (1976) ties public subsidies for private schools to an increase in the number of scholarship holders.[14]

In short, the serious financial difficulties now faced by private schools and the steadily decreasing proportion of students who attend them suggest that the contribution the private sector may be expected to make in the future towards meeting the rising demand for education will be very limited.[15] Moreover, to the extent that government regulations seek to induce greater participation by the lower social strata in private education without offering any counterpart subsidy, the financial difficulties of private schools will only worsen because so many of those serving low-income groups are already operating in the red.

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[13] In Colombia (Bogota), one of the Latin American countries in which private education is most developed, 70% of the private schools were operating at a loss. See Rebeca Bernal Zapata, *Algunos aspectos de la educacion en el Distrito Federal*, 1967, cited by Munoz Izquierdo-Hernandez (20).

[14] As Kast suggests in his comments (14), the alternative of granting educational subsidies directly to the user and allowing him to choose his school helps lower costs and improve the quality of education in contrast to the alternative of direct subsidies to the private school. This is because "the users themselves would exert conscious pressure on the final result of the education and the schools would have a clear, permanent incentive to operate in the areas of greatest social return at a minimum cost."

[15] In Bolivia, where more than 20% of the total enrollment is in private schools, this financial crisis is clearly discernible in the private Catholic schools serving the low social strata. It is found in this country that "many religious communities are transferring or want to transfer their schools to the government, or to the heads of families, or want to convert them to the semi-governmental format of "Fe y Alegria." Juan A. Morales and A. Pinell Seles (17, p. 14).

Lastly, the vigorous growth of free public education has compelled the private schools continually to adjust their role to the residual market left to them. This adjustment to the new situation varies according to whether the schools operate on the primary and secondary levels or on the university level. In the first case, the very sharp competition of free public education has prompted the private schools to adapt the education they offer to needs inadequately covered by the public sector. In practice, this has meant offering better "quality," which has entailed the conversion of private primary and secondary education into education for the elite. This is what has happened in Argentina, Brazil, Ecuador and Paraguay. Consequently, the creation of government schools that compete directly with private schools has had two negative effects on the overall financing and character of education. The first effect has simply been to supplant the existing private schools, and the second has been to induce a change in the character of private education and to make it into education for the elite (19).

In the second case, the spectacular growth of the university student population has prompted the establishment of private institutions designed to cover the market not satisfied by the government, either because restrictions have been imposed on access to free government education or because the quality of the education offered is low. In either case the private universities—as they have taken over the market not served by the public universities—have offered types of education that are low cost and whose quality is not necessarily superior to that offered by public institutions. In short, the effect of these tendencies on private education is to impose a heavy burden on public financing to the extent that efforts are made to correct the elitist effects of private education or to raise its standards of quality.

5. Prospects for the private financing of education

Summarizing the analysis of the private financing of education, we may state that, if present tendencies hold in the face of a rising demand for education, the prospects for this financing are not very encouraging. This situation is due to a combination of factors. To begin with, private enrollment as a percentage of total school enrollment is declining. Secondly, these institutions are in a very difficult financial position partly because of the small share of fees in their overall funding. Thirdly, the development of rural education with local community support is limited by rising costs per student and the wider student coverage entailed by those programs. Hence, public financing of education may be expected to play a growing role in the future. The social pressures favoring this growing role of the public sector are even greater when we consider that, even if education were entirely free of charge, the income elasticity of family expenditures on books, transportation, etc., and the income forgone while a student is attending school can impose a heavy burden. Therefore, we may expect that, as the demand for education grows, the public sector will have to address a number of problems and implications connected with the identification of additional sources of financing that are compatible not only with this greater demand, but also with equality of educational opportunities and equity in income distribution. This is precisely the subject we shall deal with in the next section.

D. PUBLIC FINANCING OF EDUCATION

In section B the point was made that, because education is a semi-public good, criteria of efficiency and equity recommended a contribution by the public sector to the financing of education in order, on the one hand, to avoid the investment of less than what was socially desirable and, on the other hand, to prevent the opportunities for education from being inequitably distributed in society. However, it is one thing to justify government participation, but quite another to determine the optimum level of that participation. Because of the difficulties of empirically quantifying the social benefits of expenditure on education and of defining equity in the apportionment of opportunities for education, the payment of a public subsidy to education is a political decision that reflects the historical tradition of government interventionism and the scale of social values or preferences.

As a result, the widest possible variety of mixes of public and private financing of education is used in the countries of Latin America. In other words, the amount to be invested in education and the mix of the public and private contributions are much more associated with political decisions that economic criteria.

The preceding section reviewed the various forms that the private contribution can take. This section will evaluate the public financing of education. In this regard, it is clear that the general budget of income and expenditure is the most important source of funding for education. Because of this, government financing of education cannot be viewed in isolation, but must be analyzed as part of a broader, more general picture that includes the competition for public funds imposed on education by the implementation of plans for health, housing, etc., and the more general effects on income distribution exerted by the entire range of public expenditures and revenues.

However, comprehensive analysis of the various sources of financing of the government's overall budget and of their effects on resource allocation and income distribution lies outside the scope of this paper, which will concentrate on the sources of public financing most directly connected with the educational sector. Hence, it will focus on the following two subjects: a) student loans at subsidized interest rates, and b) taxes specifically earmarked for financing education, whose analysis will center on the type of education for which they are most frequently used, namely vocational and technical training, which is generally financed by a payroll tax.

1. Educational credit

One of the forms of government aid to students (scholarships, meals, and free or subsidized transportation, "vouchers," leave of absence from work to take examinations, etc.)[16] that has developed the most in recent times is credit for education.[17] This is usually governed by three principles: i) granting of a subsidy by charging interest at less than the market rate, ii) channeling loans to students in the lower-income strata, and iii) aiming loans at studies at the university level. particularly training for professions that have social priority.

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[16] A survey conducted in 1959-60 by the International Study of University Admissions for a number of developed and underdeveloped countries found that, on average, 32.9% of the university students in the developed countries received direct government aid in its different forms as opposed to only 8.7% in the underdeveloped countries (32).

The purpose of these subsidized loans is to satisfy the objectives of efficiency and equity at the same time. The first objective is reflected in the policy of subsidizing some fields of study more than others so that the supply of skilled manpower will match the country's economic development needs; the second is the selective granting of subsidized loans for university studies to low-income students, and requires further that the government's funds be obtained through a progressive tax system.

To these objectives of efficiency and equity is usually added that of providing an additional source of financing for education. To the extent that a loan covers the student's academic and maintenance costs and his fees[18] it will help finance both the student and the university.

Student loan systems are in operation in most Latin American countries, though their coverage tends to vary considerably from one to another.[19] In Jamaica, 26% of the university student population obtained loans, compared with 27% in Honduras (27). Franco (8) points out that there is no single institutional pattern. Most countries (Dominican Republic, Honduras, Peru, Venezuela, etc.) have set up institutions specializing in student loans while in others this assistance is provided by general student aid institutions (Ecuador, Colombia, Panama, Argentina, etc.), by banks (Jamaica, Costa Rica, etc.), or by regional or national development institutions. In addition, in some countries these institutions are private and in others, public.

An enumeration of the various purposes that can be accomplished by student loans conveys the range of aspects to be covered by a comprehensive evaluation of the subject.[20] In the specific field of education finance, the role of student loans can be considered from two different angles. The first is whether student loans can significantly contribute to the financing of universities, which financing may involve a mix of public and private contributions different from that prevailing before the launching of a student loan program; the second concerns the possibility of setting up a revolving capital fund to enable the student loan program to finance itself with student loan recoveries.

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[17] One special type of public subsidy used in Brazil, for example, is to exempt expenditures for education from the income tax. In 1972 the income forgone by the government under this head amounted to 3% of its expenditure for education. In turn, 75% of all subsidies went to income groups earning between 8.5 and 43.7 times the minimum wage (16, pp. 14-16).

[18] If a tuition fee is charged, of course. Hence the system tends to favor private over public universities, which are usually free of charge.

[19] See (8). For an analysis of the student loan experience of a Latin American country, see (11).

[20] The reader is referred to Franco's study, which presents an interesting summary of the various purposes of educational credit in Latin America. For an analysis of the effects of the Colombian loan program on the internal efficiency of the educational system (in reducing the repetition and dropout rates), see (11, pp. 30-31).

a. Student loans and the financing of education

The contribution of student loans to the financing of higher education and the mix of public and private financing it entails depends on the lending procedure and the existing financing arrangements. If student loans replace an existing scholarship system, a greater private contribution will be obtained. If the institutions, whether public or private, insist on charging fees that cover all or part of the educational costs and the loan covers the student's maintenance and fees, then the new system, even if based on a subsidized interest rate, will also result in a new financing mix in which the relative contribution of the private sector has been increased because the fees will probably exceed the subsidy embodied in the interest rate. Conversely, if the loans finance the fees and maintenance of students admitted to free public institutions and/or cover the current cost of tuition in private institutions, the proportion of the public sector's contribution to total financing will increase to the extent of the subsidy implicit in an interest rate lower than the market rate. An interesting example is Jamaica, where in 1973 university studies were made free of charge, which reduced the number of loans applied for by 50% because thenceforth the loans would only have to help finance the student's maintenance expenses. In this case, changing the system increased the relative magnitude of the public contribution to the financing of education (1, Annex 1, p. 12).

In Colombia, where the student loan system has been in operation for more than two decades, the part of the loan for paying tuition fees in 1970 financed only 6% of the total income of private universities. In these universities, fee income accounts for 70% of total income, as opposed to only 5% in public institutions (11, Table 9). It follows from all this that whether or not the introduction of a student loan system will reduce the contribution of the public sector to the financing of education cannot be determined in advance. This will depend on the final purpose of the student loan (that is, on whether it is for the student's maintenance or for his tuition fees), and on the characteristics of the financing of the educational system (whether or not education is free of charge).

b. The self-financing capacity of a revolving fund

The other aspect of student loans relates to the establishment of a fund that will make the student loan system self-financing. Practical experience in Latin America indicates that so far this objective has not been attained because the lending institutions are continually in need of infusions of government capital. This situation is influenced by a number of factors: first, several countries are still making more loans than they are recovering; second, the steady growth of the university population is compelling a steady expansion of its coverage; third, the interest rate on the loan is not only lower than the market rate, but is actually negative in real terms.[21] As a result of these influences, it is noted that "there is not much likelihood of student loan funds becoming entirely self-sufficient as the period of full loan recovery sets in unless additional financing is provided" (1, p. 2).

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[21] In Jamaica the interest on these loans is 6% per annum, the average bank rate is 8.4%, and the annual rate of inflation (1972-73) is 10.8%. A similar situation is observed in Trinidad and Tobago (1, Table 9).

Dominguez (16) propounds the economic and financial requirements for setting up a capital fund. He emphasizes that, if a country wants to provide loans to 1% of its population and the amount of the loan comes to twice the national income *per capita*, the annual disbursement will amount to 0.2% of GNP. The revolving fund needed to maintain this disbursement flow will then range between 1.3 and 2% of GNP. To appreciate the magnitude of this amount we must bear in mind that all public expenditures on education in Latin America represented 3% of GNP in 1970.

This point is underscored with unusual clarity by the findings of a study on student loans in El Salvador (3), which endeavors to quantify the financing requirements of a 10-year lending program for the secondary and university levels. The starting point of the analysis is that both the social and the private rates of return on these investments are very high and fully justify a credit policy to promote them.[22] The amount of the loan would be equal to the income forgone by the student and the amortization period would be 25 years at an interest rate of 10% on the outstanding balance, repayment of the loan beginning at the end of the first year after graduation (holders of a secondary school certificates would begin to pay three years after receiving the loan, and university students, five years after admission to the university). No interest would accrue on the loan during the period of study. Both the amount of the loan received and the outstanding balance of principal would be adjusted to the rate of inflation. Under these conditions it is estimated that the amount repaid each year would be one-fourth of the additional income attributable to possession of an undergraduate degree.

Projections for the period 1978–87 cover the low and middle-class social sectors and are based on the assumption that 75% of the potential loan recipients are participating in this program. The projections show that in 1987 the government contribution, at constant prices of 1977, will account for as much as 50% of the total current expenditures of the Salvadorean Government in 1975 and 4% of GNP in 1976. In the tenth year of the program, loan amortizations will cover only 8.3% of the loans granted in that year.

These findings for El Salvador clearly point up the limited possibility of a student loan program becoming a significant instrument for solving the problems of financing higher education. We can therefore assert that student loans are only suitable for financing maintenance or tuition expenses, but not both, or else to finance secondary or higher education, but not both. For example, it was not until 1969 that the Colombian Institute of Student Loans and Technical Studies Abroad (ICETEX), founded in 1950, was able to step up its lending significantly to cover about 10% of the student population a year. This jump was made possible by a substantial contribution from the public sector, which authorized the commercial banks to rediscount ICETEX loans at interest of 2% (11, p. 2).

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[22] "There is a strong incentive for persons of low and middle socio-economic status to invest in low-cost secondary and in university education. Except for the area of law, all the university specialties for which we had reliable data show a marked excess of benefits over costs at an interest or discount rate of 10% (3, p. 313).

2. Taxes specifically earmarked for financing education

Though it violates the traditional fiscal rule of avoiding the establishment of taxes and expenditures for specific purposes, an earmarked tax has the advantage of being a reliable and stable source of financing. The educational area to which its revenues are assigned can be programmed on a sounder financial basis. Latin America can offer a variety of experiences with specific taxes for educational programs.[23]

In Brazil the steep rise in total expenditures on education relative to the gross national product, from 1.6% in 1960 to 3.0% in 1974, was closely associated with the special allocation of tax revenues to education and the tapping of extrabudgetary sources (16, p. 13).

Among all the various specific taxes, perhaps the most important are payroll taxes for financing technical and vocational training programs. In most Latin American countries, these programs are funded by a tax on wages (ranging from 0.5% to 2%) (18). They exist in Argentina (CONET), Brazil (SENAI), Colombia (SENA), Ecuador (SECAP), Guatemala (INTECAP), Honduras (INFOP), Paraguay (SNPP), Peru (SENATI) and Venezuela (INCE). These funds are used to finance institutions that train skilled labor, especially for industry. It is important to emphasize two aspects of this financial and manpower training arrangement; the first relates to its distributive implications and the second, to the quantitative scale of vocational training.

a. *Financing of technico-vocational training and its distributive effects*

Since technical and vocational training in Latin America is usually free of charge, the distributive effects of these programs are dependent on two factors: the incidence of the payroll tax (who pays the cost of the training) and the socio-economic origin of the students (who receives or benefits from the training).

Analysis of who pays the payroll tax should obviously be preceded by a consideration of who should "pay" for vocational and technical training: the trainees or the taxpayers. It is clear that the greater future earning capacity generated by this kind of investment can be appropriated by the public or private enterprise that employs the graduate as well as by the graduate himself (24). Hence it is reasonable to assume that the two of them should pay the cost of the training. In the case of the enterprise we must start by distinguishing between general and specific training. In the first case, the trainee acquires general skills, which makes it unlikely that an enterprise, operating in a competitive market, will be willing to pay the cost of training under a program of this kind, since the benefits are not for itself alone, but for any enterprise. On the other hand, if the training is specific, the external economies are fewer and consequently there is more justification for a direct contribution by the entrepreneur.

Let us now consider the benefit to the trainee. It is usually argued that this benefit may equal or exceed the benefit to the enterprise that employs him, and that he should therefore help finance the cost of his own training. However, there is very little empirical evidence to support the assumption that this type of training affects the trainee's later income to any significant degree.[24]

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[23] For an analysis of the various types of specific taxes for education in Latin America, see (30).

These considerations suggest that no clear answer can be given to the question of who should pay the cost of technico-vocational training. In some cases the benefits of this training may be appropriated by the enterprise and in others by the trainee. Hence the rationality of a payroll tax, for, in theory, its incidence could affect both beneficiaries. If, however, we bear in mind that tuition is free for both enterprise and trainee, then if the tax is shifted to the consumer, neither of them will pay the cost of the training. This is why the distributive aspects of the financing are limited to determining whether this tax reduces the earnings of the enterprise or the wages of the workers, or raises the prices paid by the consumer. In view of the industrial structure of Latin America (monopolies, strong labor unions, etc.), it is highly probable that the payroll tax is passed on to consumers in higher prices, which makes it difficult to determine which socio-economic group ultimately pays the cost of the training.[25]

b. Social composition of the student body in technico-vocational schools

As to the social origin of the students of technico-vocational schools, that is, of the trainees themselves, Moura Castro (18) points out that, while no clear social recruitment profile can be distinguished, the trend appears to be for the more prestigious institutions to recruit trainees of higher socio-economic status. In other words, it is not the kind of school or the training methods used that determine the social composition of the student body, but the academic excellence of the institution and its reputation in its technical field.

A comparative analysis of SENA in Colombia and SENAI in Brazil illustrates this point. SENA offers long, three-year courses that focus more on supervisory functions than on manual occupations. Hence, its students are drawn from the middle class or from the upper level of the lower class. Conversely, SENAI in Brazil offers short courses that turn out skilled workers in a year or less, and hence takes in a relatively larger proportion of students from the lower class. Middle-class trainees do not exceed 10% of the SENAI student body.

Moura Castro's study (18) brings out how small the enrollment in vocational training is in Latin America compared with enrollment in the formal education system, the aggregate labor force or that of the secondary sector in particular. In 1974 the number of persons enrolled in vocational training did not average more than 1% of the total number of students at the primary and secondary levels of formal education in Latin America. Exceptions to this are SENA in Colombia (7%), UTU in Uruguay (6.43%) and INCE in Venezuela (5.50%).

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[24] In his studies of SENA in Colombia, Puryear (23) suggests that the income effect can be significant for graduates of vocational training courses of long duration. The evidence is less clear, however, for courses of short duration.

[25] Moura Castro (18) emphasizes that, in Brazil, there is a redistribution from small to large enterprises because, while the tax base is very similar regardless of the size of the enterprise, the big enterprises hire more SENAI graduates. Simon Teitel (31), on the other hand, questions this conclusion because in some countries this tax increases with the size of the enterprise. Another aspect of the payroll tax to be borne in mind is that it adversely affects the allocation of production factors because of the relative abundance of labor, particularly in view of the heavy impact of social security laws on the cost of labor.

If we now relate the flow of graduates to the total labor force, we arrive at a proportion of 0.5%. Nor does the picture change much if we compare it with the labor force in the secondary sector: the average ranges around 1%. Two major exceptions are SENAI in Brazil (3.83%) and SENA in Colombia (6.63%).

The limited quantitative impact of technico-vocational training justifies the deduction that an ambitious program of development in this area of education cannot be based solely on the payroll tax, since this tax would then have to be raised even more and its heavy impact on the cost of labor could upset the existing equilibrium among factors of production in Latin America. Hence the financing of technico-vocational education cannot be evaluated in terms of distinct compartments of formal and non-formal, academic and technico-vocational education. On the contrary, the financial requirements imposed by a growing demand for education must be viewed in an overall context that takes in the entire tax system and all educational levels, formal and non-formal, academic and technico-vocational.

E. ALTERNATIVE SCHEMES AND OVERALL PROPOSALS FOR THE FINANCING OF HIGHER EDUCATION

As a result of the recurrent financial crises brought on by the mushrooming of the student population at the university level, and inspired in some degree by Friedman's proposal for the United States, the idea began to grow that student loans should be part of a much broader financing scheme. In this scheme, public and private institutions of higher learning charge for the total cost of education, and loans are provided to assure that admission to university is equitable and independent of the student's income level. This last feature implies that education is regarded as an investment in physical capital, so that, given the imperfections of the capital market, the only purpose of the student loan should be to advance the funds for the duration of the process of increasing the student's productive capacity.

This scheme also seeks to rectify the distributive distortions observable today at the higher level of education in countries that have public and private universities. Analysis of the social composition of the student bodies of both types of institution shows that students from the higher-income strata predominate in private institutions. Furthermore, the "quality" of education is usually higher in the private schools than in the public schools.[26] As a result, even if the cost of studying is higher in private institutions than in public institutions, the higher income that graduates of private universities command more than offsets the differences in the cost of education. This being so, the purpose of the combination of payment for education at public and private universities and loans to low-income students to give them the same capacity to invest in education as students from high-income groups, is to give effect to the principle of free choice of university by students and thus to eliminate the present social stratification implicit in the system of public and private universities.

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[26] In this case, quality must be understood not only as a better "educational product," but also in the sense that the labor market, rightly or wrongly, assigns a higher value to graduates of private institutions than to those of public institutions.

The proponents of this overall scheme argue that the political reality of Latin America has resulted in the building of a regressive tax system and, as a result, the public financing of education entails in practice a regressive redistribution of the income of the low-income groups to the high-income groups, who remain longer in the educational system. To avoid these undesirable distributive effects, they recommend that public expenditures on education be replaced by the income obtained from charging for the total cost of education. Since the opportunities for admission to a university will then be greater for applicants from high-income groups, they seek to offset the "price" effect on the demand for education by providing loans for low-income students.

This scheme is now being widely debated in the academic and political communities of Latin America. In general, the debate turns on the possibilities of correcting the present regressiveness of the tax system. For some, the extensive experience of Latin America in frustrated tax-reform projects suggests that it is advisable to acknowledge this socio-political fact and to propose an alternative scheme based, on the one hand, on charging for the total cost of education and, on the other hand, on facilitating access to it by the low-income sectors through student loans. For others, the proper course is to correct the regressiveness of the tax system so as to establish the financing of education on a more equitable basis.

Of course, this debate lies outside the bounds of the present study of the financing of education. However, it is apposite to cite here some tax proposals made under an approach which is an alternative to Friedman's, and aims at reconciling the objectives of economic efficiency and distributive equity. The central thesis in these proposals is that it is not only socially desirable but also politically feasible to make the tax system more progressive, particularly bearing in mind, as may be seen in Table VI-5, that, at the higher level of education, the funds obtained from general revenue usually finance the bulk of the expenditure on education.

An early proposal by Jallade (13) asserts that public subsidies to education should be provided in inverse relation to income, and that those subsidies should be financed out of a surtax on high incomes. In Colombia, for example, where the system of public subsidies to secondary and higher education entails a transfer of income from the low-income to the middle and high-income groups, the yield of this tax should be used to finance the access of low-income students to post-primary education. In this way the high-income groups would be the largest contributors to the public subsidy designed to finance the lower-income groups.

Jallade further proposes a progressive tax on the income of educated persons, which, by reducing the present value of the net government subsidy to high-income groups, would increase that to low-income groups and so offset the net subsidy resulting from different enrollment ratios for different income groups. One simple tax device would be to raise the income tax rate for educated persons. The limitation of this mechanism is that the tax base would be the total income and not the additional income resulting from more schooling.

Another proposal by Tanzi (30) starts from the principle that, just as there is a tax on the value added to real estate by public investments in roads, water supplies, etc., there should also be a tax on the value added to human capital by government education plans and subsidies. In both cases the government should appropriate part of the benefits deriving from public investments or expenditures. The revenue generated by this tax could then be used to finance primary and rural education.[27]

The reason for taxing the higher value of human capital is not that the owner of the capital has a greater capacity to pay, but that he has benefited from government action in education. Hence Tanzi further proposes that educated persons be taxed in proportion to their greater tax-paying capacity. The problem in this tax is that, in the experience of most of the countries, professional people (physicians, lawyers, engineers, etc.) are among the worst tax evaders. Accordingly, Tanzi, on the basis of the experience of Portugal, proposes a tax similar to the presumptive assessment of physical property. In this case the taxing authority could—by a survey or some other means—estimate the minimum income of every professional in each profession. This would constitute the floor income to which the tax rate would be applied. In any case, the professional would have to declare the income he had earned during the year and, if that income exceeded that legal minimum, he would be taxed on the basis of his current income.

One interesting proposal along these lines has been made for Costa Rica (10, pp. 127-135). In 1977, 86% of the total income of the Costa Rican universities was financed out of the tax revenues that feed the "Fund for the Financing of Higher Education," the most important source of these revenues being the income tax. It is also estimated that taxes paid by university-trained professionals accounted for only 15.5% of total income tax receipts. It therefore follows that the contribution of professionals to the financing of higher education is very small. Consequently, in Costa Rica there is very little relation between those who receive university education and those who pay for it, and this lack of relation is increased by the fact that those who are admitted to and remain in the university belong to the middle and high strata of society.[28] Therefore, on the principle that the beneficiaries of educational services should finance all or part of the cost of university education, it has been proposed that an additional tax might be levied on professionals and on students who drop out after completing the first year of higher education. The base for this tax would be the difference between the presumed income of the graduate of secondary education and the present income earned by professionals. The yield of a tax of 5% on the difference between the two incomes would finance two-thirds of the cost of higher education in 1977, which in turn is 50% of the government's current contribution to the universities. The financial significance of this proposal must be assessed in the context of the accelerated growth of higher education: between 1966 and 1976, GNP increased 82%, central government expenditure 103%, public expenditure on education 175%, and public expenditure on post-secondary education 503%.[29] This explosive growth at the university level took place at the expense of primary and pre-school education: whereas in 1966 the government provided one peso for education at the higher level for every six pesos spent on the primary level, in 1977 the higher level received one peso for every two pesos going to the primary level.

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[27] A critical comment on this approach has been outlined by Alfonso Pastore (25), who maintains that the peculiar feature of human capital is that, unlike physical capital, only the use of this capital, but not the capital itself, can be sold. In this case, what is needed is not a tax on the greater value of the capital but on its yield. This is why the income tax serves as a tax on the higher value of human capital.

[28] While the occupational categories that presumably represent the highest social levels in Costa Rica account for 24% of the employed heads of families in the population census, these same occupational categories account for 56% of the enrollment in the University of Costa Rica. Meanwhile, unskilled workers and laborers account for only one-third (10).

F. SUMMARY AND CLOSING REMARKS

Education is one of the social areas in which "self-criticism" has been most intense in recent years. Ironically, despite the indisputable fact that all the countries of Latin America have increased their expenditures on education, the community shows very little appreciation of what has been done. The expectations that have arisen in every Latin American country have far outstripped their own achievements. This growing dissatisfaction is shared, and even fed, by different sectors of society.

From the government's standpoint, the dissatisfaction is associated with the feeling that the uninterrupted rise in public expenditure on education not only conflicts with the expansion of public expenditures on other social areas of equal priority, but can also create serious financial problems and thereby restrict access to the free education system unless new ways and means are found of reducing the cost per student and/or of increasing the financial resources.

On the side of those who want an education, the dissatisfaction gap is also widened by the high drop-out and repetition rates and the difficulties that graduates encounter in finding suitable employment, as can be seen from the "brain drain" and the underemployment of educated people.

Finally, for society as a whole, the gap is the result of the limited impact the expansion of education has had in recent years on economic efficiency and distributive equity.

In view of this current diagnosis, this paper has endeavored to reexamine the principal public and private sources of financing for education. Only those sources that are directly associated with financial support for education have been considered, and therefore the tax revenues that finance the general budgets of governments have been excluded.

The analysis began with a review of the financial projections deriving from an estimate of the demand for education in 1980 and 1985. These projections bring out that, even with substantial increases in the enrollment ratios at all levels of education, there should be no explosive growth of expenditures on education relative to the GNP or (for public outlays) to government budgets. On the contrary, they should peak in 1980 and then level off. Accordingly, the following sections analyzed various possible sources of financing in the private and public sectors of the economy and assessed their efforts on efficiency and on distributive equity.

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[29] Public expenditure on education represented 4% of GNP in 1976 and 6.1% in 1976 (10).

Since education is a semi-public good, it has been financed and provided by both the public and the private sectors, unlike other expenditures such as those for internal and foreign security. It is important to bear in mind that both the total amount of the expenditure and the mix of public and private financing are much more dependent on socio-political considerations than on economic criteria, since in the last analysis the two aspects reflect a society's scale of values and the strength of its statist tradition. That is, the socio-political situation of a country would seem to suggest that normative economics is not a tool for determining the desired amount and optimum mix of financing for expenditures on education. On the other hand, economic analysis can be an appropriate instrument for assessing the impact on economic efficiency and income distribution of political decisions about the amount and mix of public and private financing for education. In other words, the relevant question is not how much a country should spend on education and what is the best mix of public and private funds, but how the contribution is financed and what other alternative sources of funds compatible with the criteria of efficiency and equity are available.

To analyze the financing of education, it is first necessary to determine the components of the total expenditure on education (both public and private) made by a family. The present study began with a broad definition of expenditure on education that included not only direct expenditure for school instruction and building maintenance, but also the income forgone while the student is studying and other additional expenses incurred by the family for transportation, books, private courses, etc.

Such a broad definition of expenditure on education made it possible to infer that, even if no charge were made for education, it was not really free because of the greater relative impact of the income forgone and certain family expenses associated with school attendance on the income level of the lower strata. This led to the suggestion that, to give effect to the principle of equality of educational opportunity, governments should contribute to the financing of these expenses.

With regard to the financing of the direct cost of education, it should be borne in mind that education is provided concurrently through public schools that charge nothing and private schools that charge for all or part of the cost of education. It is usually argued that, since education is an investment that assures higher income in the future, students at private schools—who are usually from the higher-income strata—should pay for their own education, whereas the government—either through free schooling or student aid—should facilitate access to education for lower-income strata. This compartmentalization into paid private institutions and free public institutions is viewed with some apprehension in Latin America for two reasons. First, while the cost of private education is indeed higher than that of public education, the higher income earned by "private" graduates can more than offset the higher cost. Second, the distributive impact of free public education depends on who receives and who finances it. It is observed that, in Latin America, the beneficiary of the educational service is not necessarily a member of the low-income strata, and the financing is based on a regressive tax system.

Beyond the foregoing considerations, however, developments in Latin America now show that private schools are in the throes of a serious financial crisis because of the difficulties they are encountering either in recovering the full cost of their educational service through tuition fees, or in finding additional sources of financing with which to close the gap between costs and tuition fees.

All this indicates that the capability of the educational system to absorb an ever-growing student population will in the future depend on the capacity of the public sector to find new sources of financing. It should be recalled that in recent years the social primacy of expenditure on education has been threatened by the rising importance of other social services (health, housing, etc.). During the fifties and sixties, social and political considerations—reinforced by the conviction that investment in human capital could solve many of the problems of underdevelopment—prompted governments to give high priority to the expansion of the educational system. In the future, however, in view of the inevitable competition of investments in other social areas and in physical capital, there is very little likelihood that education will be able to obtain, as in the past, a larger piece of the budgetary pie. For this and other reasons, to solve the problems of education in the coming years it will be urgently necessary to devise new financial strategies for diversifying the sources of funds.

The debate on the financing of education, particularly at the university level, has polarized around two opposing approaches. They agree with the diagnosis that both the way in which public expenditure on education is allocated among socioeconomic groups and the sources of its financing are very far from satisfying the principle of distributive equity. They differ, however, on the financing strategy to be followed.

One approach starts from the assumption that not only does the sociopolitical situation of Latin America tend to frustrate proposals for greater progressivity of taxation but, moreover, free education is usually relatively more favorable to high-income groups. Accordingly, the approach suggests that public and private university-level institutions should charge for the total cost of education, and that the governments should provide scholarships and subsidized student loans to safeguard the principle of equal opportunity and equitable income distribution. This would also increase the relative contribution of the private sector to the financing of education. As has been noted, this approach is designed primarily to solve the problem of financing the higher level, and does not change existing arrangements on the secondary and primary levels. Thus, it takes no notice of the fact that in Latin America the "filter" of social selection is located not at the higher level but at the secondary level.

Conversely, the other approach maintains that the financial difficulties of the private schools and the limited success of student loan schemes suggest a greater social preference for increased public contributions to the financing of education. To satisfy distributive equity, an expansion of education must take account of who receives and who pays for the education. This means that the inequity observed in Latin America in the distribution of the investment in education and in its financing may be corrected, on the one hand, by making the tax system more progressive and, on the other hand, by guaranteeing access to education to the low-income sectors by providing them with funds to cover the income forgone and the family expenditure on education.

The choice of one or the other approach will ultimately depend on the sociopolitical feasibility of acting on two key factors. The first relates to the possibility of establishing a progressive tax system, and the second, to breaking the "filter" of social selection operating at the secondary level of education. Therefore, it is not possible to give a standard, comprehensive financing recipe that will be suitable for all the countries of Latin America. Instead, the situation of each individual country will have to be analyzed and evaluated separately in order to determine the financial scheme best suited to its socio-political structure.

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STATISTICAL APPENDIX

Table VI-1. Latin America: Enrollment Ratios by Age Cohort and Level of Education, 1970, 1980 and 1985
(Percentages)

Educational level	Dagnino Pastore Projection[1]			Muñoz Izquierdo Projection[2]					
				Lower limit			Upper limit		
	1970	1980	1985	1970	1980	1985	1970	1980	1985
Primary	91.5	110.0	110.6	82.7	80.9	81.0	82.7	87.0	87.2
Secondary	26.9	42.5	51.0	28.5	40.8	40.6	28.6	49.6	49.3
Higher	6.7	12.5	14.6	5.7	4.9	5.2	5.7	9.9	10.6
				INDEX 1970 = 100					
Primary	100.0	120.2	120.9	100.0	97.9	100.0	100.0	105.2	103.3
Secondary	100.0	158.0	189.6	100.0	143.2	140.4	100.0	174.0	173.0
Higher	100.0	186.6	217.9	100.0	86.0	91.2	100.0	173.7	171.9

Source: [1] See (4).
[2] Elaboration based on Tables 5-1 to 5-10 in (21).

Table VI-2. Latin America: Ratio of Total (Public and Private) Expenditure for Education to GNP and of Public Expenditures for Education to Total Public Expenditures 1970, 1980 and 1985
(Percentages)

Ratio	Dagnino Pastore Projection[1]			Muñoz Izquierdo Projection[2]				
					Hypothesis of lower-limit enrollment with rapid GNP growth		Hypothesis of upper-limit enrollment with slow GNP growth	
	1970	1980	1985	1970	1980	1985	1980	1985
Expenditures (public and private) for education/GNP	4.04	4.51	4.24	4.0	2.7	2.1	4.3	3.9
Public expenditures for education/total public expenditures	21.1	18.5	16.5	15.8[1]	10.8	8.4	17.6	15.9

Source: [1] See (4).
[2] Elaborated from Tables 6-1 to 6-12 in (21). The values for 1970 could not be estimated.
[3] Corresponds to 1973.

Table VI-3. Incidental Expenses in Public Schools as a Percentage of the Total Cost Per Student/Year

Country	Percentage of total cost
ARGENTINA	
Primary	17
Secondary	20
ECUADOR	
Primary	35
Secondary	29
MEXICO	
Primary	11
Secondary	4
PARAGUAY	
Primary	18
Secondary	24

Source: Claudio de Moura Castro (19).

Table VI-4. Level and Trend of Private Education in Selected Countries of Latin America, 1974

	Primary level		Secondary level		Higher level	
	Ratio of private to public education growth rate[1]	Private education as % of total (1974)	Ratio of private to public education growth rate[1]	Private education as % of total (1974)	Ratio of private to public education growth rate[1]	Private education as % of total (1974)
BOLIVIA	1.66	13.6	0.54	25.9	—	—
COLOMBIA	1.07	14.6	0.73	49.8	1.73	51.6
MEXICO	0.98	7.8	1.28	32.8[2]	0.98	12.5
PERU	0.77	12.9	0.46	17.3	2.03	27.1
VENEZUELA	0.46	11.4	0.61	18.3	0.68	9.6

[1] This is the quotient obtained by dividing the annual geometric growth rate of private education by that of public education for the following periods: Bolivia (1970–74); Colombia (primary 1964–74, secondary 1966–74 and higher 1970–74); Mexico (1970–74); Peru (1964–74); and Venezuela (1969–73).

[2] Basic intermediate level.

Source: Muñoz Izquierdo, C. and Alberto Hernández Medina (20), Tables 2, 3, 6 and 7.

Table VI-5. Structure of Sources of Income for Higher Education

Source	Costa Rica (1976)	U.S.A. (1971-1972)	Argentina (1971)
1. Sales of goods and services	1.3	11.9	7.3
2. Tuition fees	8.2	20.0	—
3. Government transfers	86.8	59.0	92.7
4. Transfers from the private and external sectors	3.7	9.1	—

Source: ILPES (10), Table 15.

CHAPTER VII

Financing of Education and Social Development in Latin America

Luis Ratinoff[1] *and Máximo Jeria*[2]

INTRODUCTION

This exercise is predicated on the proposition that Latin American public education systems subsidize the high-income social sectors to a significant extent. It tentatively explores the possibility of changing that situation by assuming a new set of circumstances in which such groups pay the entire cost of their education and public funds are used exclusively to subsidize the education of lower-income families.

A. SOCIAL DISTRIBUTION OF EDUCATIONAL EXPENDITURE

National statistics, studies of the operation of school systems in the hemisphere, and data on expenditure by level of education illustrate the regressive nature of the social distribution of this benefit.

While the 78% primary school enrollment in 1970 accounted for only 50% of public expenditure, the 2.8% university enrollment received 25%. This distribution by educational level is in direct relation to the percentage participation of families in different income brackets in the benefits of education. The information available shows an impressive increase in the number of students from higher-income families at progressively higher levels of the educational pyramid. (See Table VII-2.)

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[3] Because of the pressure of time and the volume of data used, it was not possible to include a complete statistical appendix.

Table VII-3 also shows how the systems' retention capacity varies according to income level. It is estimated that students from lower-income families remain in school for an average 2.5 years; those in the lower-middle brackets, for 8.6 years; upper-middle, for 14.2 years; and higher brackets, for almost 17 years. Accordingly, the higher income groups—which represent about 8% of the enrolled student population—receive almost one third of public expenditure on education.

Students from poor families receive less education in terms of years of schooling. There is some evidence that they enter school later, obtain fewer promotions from one grade to the next, and receive poorer quality instruction. These facts notwithstanding, if we assume that grade level retardation, repeater rates, and the quality of education are the same for the various income brackets, it is obvious that the benefits received by students from higher-income groups are vastly superior to those received by students from poor families.

Estimates of public expenditure and retention rates by income groups provide a rough idea of the cost breakdown by student and by generation.

The figures in Table VII-4 do not completely reflect the magnitude of the differences because the methodology used was determined by the lack of information. Had it been possible to follow certain student cohorts through their school life, the participation level of the higher-income groups would -probably have been even higher. In any event, the differences are striking. Students from wealthier families receive 20 to 40 times as many public benefits as those from poorer families.

It must be remembered that these considerations refer exclusively to the enrolled population. In addition, there is the complete disenfrachisement of school-age children from families living in extreme poverty. In 1970, this group represented between 17 and 19 million individuals who failed to derive a single educational benefit from the public sector.

B. REGIONAL DIFFERENCES

The general picture depicting regional averages masks important differences. In some countries, the educational systems are excessively regressive; in others, they are relatively more equitable. While a certain relationship can be discerned between the regressivity of the educational systems and the level of economic underdevelopment, a substantial amount of the variation cannot be so easily explained, and is more apt to stem from factors specific to the social and institutional structure.

From the standpoint of educational development Latin American countries can be classified in four groups, each representing a typical inequitable situation. Certain countries are obviously hard to classify, because the recent dynamic expansion of their educational systems situates them at the mid-point, more or less equidistant from each of the two contiguous typical situations. But they are the exception rather than the rule. Moreover, their populations represent only a small fraction of the region's total.

First of all, a methodological caveat. The purpose of a classification such as the one proposed here is not to establish "statistically representative" averages of particular traits. Our aim is to trace the typical profile of a situation on the basis of certain selected indicators of the scope and efficiency of educational systems.

The classification assumes that inequality of access to educational benefits is of paramount importance in evaluating the development of educational systems and their effect on the social distribution of income.

Background studies indicate that it is advisable to distinguish four typical situations. Table VII-5 contains illustrative figures that justify that decision.

Where educational systems are least developed, their coverage is low. Slightly over half the population receives primary education; only about 10% reaches the secondary level; and 2%, the university. Drop-out and repeater rates are high, and the grade level retardation rate (overage students) is between 60 and 70%. It is obvious that, despite their narrow recruiting base, these systems are extremely inefficient.

In situations II and III, educational development improves and there is a gradual but perceptible widening of the recruiting base without impaired efficiency. As a matter of fact, the efficiency indicators actually tend to improve, particularly in higher education, and even in situation II countries there is a rapid reduction in the number of overage students.

In situation I coverage at all levels is much broader, particularly in secondary and higher education, and the efficiency indicators improve. As may be seen, the great majority of the population receives some primary education and remains in school longer. There is also a significant correlation between grades and age groups.

The typical situations described reflect varying degrees of inequity. As the data and estimates suggest, the different educational levels are associated with specific income groups, so that in the long run the system tends to promote students from higher income families. In the most educationally backward countries, barely 1% of the students in first grade are from that group. About 6% are from middle income groups, and 93% from the lower income brackets. Note that in the final grade of the primary level, 4% are from higher income, 25% from the middle income and 71% from lower-income families. The lower-income group disappears in the subsequent levels. At the secondary level the middle income groups account for 91% of the students in the first grade and barely 60% in the last grade, while higher-income groups start with 9% and finish with 40%, and account for almost 100% of university level students. The egregious lack of social capillarity of this educational situation is obvious.

In the other typical situations, the participation of middle income groups increases perceptibly in the post-primary levels. The major differences between situations I, II and III are due to the retention rate for students from upper-middle income families in situations II and III, compared with the relatively higher retention rate for the lower-middle income group in situation I. The figures in Table VII-7 suggest a significant, albeit slight, increase in the social capillarity of the school systems in situations where educational development is more advanced. This might be even more clearly seen if available data afforded a basis for comparison of absolute income levels rather than of relative positions.

In situations where educational development is more advanced, the average student from lower and lower-middle income families seems to receive a significantly higher share of public expenditure on education. This is the result of better quality of education rather than of the additional time the students remain in the system.

Finally, two significant factors that affect the inequity characterizing the four typical situations described should be mentioned.

First, the extent of educational coverage of urban and rural sectors. Figures show that, where educational development is minimal, the gap between urban and rural areas widens, as may be seen in Table VII-9.

This provides a partial explanation of the low coverage of primary education, the high number of overage students, and the low retention rates in situations where education is less developed. It should be remembered that, of the 18 million school-age children not attending school in Latin America, only 11% are in countries where education is more advanced, although they represent 19% of the regional population between 6 and 15 years of age. In contrast, the more backward countries account for almost 20% of the out-of-school population and only 12% of the school-age group.

The inevitable conclusion to be drawn from background information on and estimates of the operation of the region's educational systems is that their ability to support upward mobility of students from lower-income groups is limited. Moreover, the distribution of expenditure on public education among the various income groups is such that the systems seem designed to intensify or sustain the existing inequities.

In lower educational development situations, educational institutions seem simply to reflect the inequities of the social structure, for the limitations it imposes are hard to overcome. The socio-economic context is characterized by sharp disparities and low *per capita* income, so that the highest income decile contains at most 2% of the families. In any event, their internal income distribution covers a broad spectrum that may well be polarized and lacking in continuity. The middle-income groups are small (between 5 and 10% of the families) and their average income is relatively low. Much of the population still lives in rural areas, and many of them are probably farmers at the subsistence level. This is the main reason for the very low primary school coverage.

Slightly more advanced situations show some variations on the preceding picture. Generally speaking, the more marked social and economic differentiation is reflected in a gradual increase in the group in the highest decile of the income scale (to slightly over 5%) and of the middle-income groups (from 15 to 25%). There is also a noteworthy surge in upward mobility in the middle-income groups and consequently the formation of various heterogeneous strata that reflect a variety of upward and downward shifts. The average income of each group is higher, which in turn makes it easier for the educational system to achieve wider coverage, particularly at the secondary and higher levels. In general, there is greater overall continuity between educational institutions and the social structure.

The importance acquired by the upper-middle income group in a situation of greater educational development points to a substantial increase in the upward mobility of those social groups that were previously disadvantaged.

These notes suggest, on the one hand, that the possibilities of using the region's educational systems as a means of accelerating social mobility are limited and, on the other, that such opportunities differ in quantity and quality according to the general and educational development of the individual countries. In any case, the problem of the visibly regressive distribution of public expenditure on education points to the need to devise remedial measures. These will probably entail changes in the structure of the educational systems, a redefinition of their objectives, and the use of new recruiting mechanisms.

C. FREE EDUCATION AND EQUALITY OF OPPORTUNITY

To overcome the excesses of the socially regressive distribution of public expenditure on education, a number of measures have been proposed, all of which are designed to extract from the higher-income groups additional funds equivalent, if possible, to the value of the benefits they receive from the public sector. The solutions vary according to the direct or indirect nature of the measures proposed for achieving this aim. The main issue is to determine whether the tax system is efficient and adequate, or whether direct payment for the service provided is the only effective method. Whichever alternative is chosen, there is always the possibility of payments during the period of education or of their postponement to some future date.

There are a number of arguments in favor of each solution, but this is not the place to examine them. We need only point out that the more indirect the nature of the measure selected and the longer the time for which obligations are postponed, the more the social responsibility becomes diffused. The chances are that equitable distribution of educational benefits requires a complex financing strategy that gives equal consideration to the ability to pay of the various social groups and the benefits they receive. Some income groups will have no trouble making direct payment during the period of education; others can do so only by borrowing; some are unable to obtain loans, but can pledge part of their future earnings; and, finally, there are families that must be completely subsidized. In some instances, such subsidy—in addition to covering the cost of the service—must include additional financial aid to compensate for part of the income forgone.

It must be remembered that if the regressive distribution of the benefits of public education is to be corrected, additional resources for financing the necessary expansion and improvement of the system must be obtained, since if all social groups are to continue to receive free education, that goal cannot be attained. Three interrelated questions should perhaps be distinguished:

1. First, the relationship between free education and educational development, especially the dynamic features of certain situations. This is essential for later evaluation of the implications of the proposed measures.

2. Second, the results of a radical policy that would compel higher-income groups to cover the cost of the secondary and higher education they receive, whether in the public or private sector. Here there are two problems that cannot be overlooked: the relationship between the resources actually released that will be available to the public sector, and releasing of the public sector from its obligation to meet the demand for education of all social groups.

3. Third, the effect of the proposed measures on the development of the educational system and their probable impact on the democratization of education; for while a more equitable contribution to the financing of the service may have been attained this alone cannot change the pre-existing conditions in and outside

educational institutions that favor higher-income groups. The question is whether such measures are sufficient to attain this goal; or whether, on the contrary, they might have undesirable consequences if they are not supplemented by others.

D. EDUCATIONAL DEVELOPMENT AND FREE EDUCATION

Without attempting to give a detailed account of each nation's situation, we should like to examine some of the dynamic relationships between free public education and educational development in the various countries. To do so, we have selected certain typical experiences in Latin America to provide a better framework for analyzing the problems caused by the proposed measures. These scenarios assume that these new financing measures would not make sense in a social structure in which the system guarantees the same amount and quality of education to all income groups. Four typical situations may occur when differences arise.

1. There are sufficient funds to maintain a reasonable uniformity in the quality of the education provided for all social groups. While quality is uniform, access differs according to the social sector, so that any attempt to bring the disadvantaged into the system or to improve their educational opportunities requires additional funding and probably structural changes in the educational institutions.

If these additional funds are available, the only constraints on the expansion of the public school system stem from the social structure and take the form of resistance to institutional change and difficulties in maintaining the same standards of efficiency when the recruiting bases are broadened. If there is enough time for a gradual transition, the necessary adjustments may well be made without significant disruptions; and private educational institutions will probably account for only a small part of the system.

2. It may be necessary to broaden the recruiting base of the public system within a limited period and without assured funding. The heterogeneous nature of the system will probably increase. Varying standards of quality result, so that the higher-income groups tend to monopolize a share of resources that is totally out of proportion to their relative size. This situation favors the establishment of parallel public subsystems.

The result is a conflict between the resources needed by the high-quality subsystem to meet the demand of the families it serves and those required by the lowest-quality subsystem for expanded coverage. Experience shows that a certain amount of compromise is possible so long as the resources available make it possible to keep the quality of the first subsystem from deteriorating too much and to gradually expand the second.

Another alternative is to reduce the rate of expansion to a minimum, either in the system in general or in certain levels in particular. In any case, it is hard to keep this situation in balance, and the implicit cost is the forfeiting of any possibility of substantial improvements in the high quality subsystem.

In the course of this process, the inability of the public system by itself to meet this double challenge becomes apparent, and this could encourage expansion of a private sector, particularly at the secondary and higher levels.

3. When the foregoing situation can no longer be tolerated, a parallel private sector will emerge to meet the needs of the higher-income groups, despite the availability of free public education, either because social pressures demand a quickened

pace and a broadened recruiting base, or because the resulting situation with regard to resources undermines the efficiency of the high quality subsector.

In such instances, there will be a marked shift of the high-income group to private schools and universities, whose expansion will depend on their ability to supply a better quality education. This expansion will have the support of the public sector, for in the worst case it alone will bear the brunt of the responsibility for a subsidy that covers part of the cost of the education demanded by higher-income families. Any amount not covered by such subsidy will come from fees or possibly from other private sources. Pressures on the educational system may well build up so fast that the situation as regards resources in the public sector becomes even more critical. Subsidies to the private sector would then have to be gradually cut back and the payment of fees in public higher and secondary education institutions to cover part of the cost of education might eventually be institutionalized.

4. These three sequences assume the prior existence at some point of a relatively extensive and efficient system of free public education. There are situations characterized by limited educational development in which this sector has not expanded significantly and numerous private educational institutions also exist. In such instances, the private sector is more important at the secondary level, as if the process responded to an implicit strategy of social selection that puts on the critical path to the university a group of better quality educational institutions designed to meet the demands of higher-income families. Graduates of public secondary schools are not well equipped to compete with their private school counterparts for admission to institutions of higher education. Although in these instances the possibility of educational development through rapid expansion and improvement of the public sector should be postulated, experience would seem to indicate that the national educational system will continue to grow while a certain balance between the two sectors is maintained. Private universities can be expected to become even more important, especially if increased pressure on public universities results in a deterioration in the quality of the education they provide.

E. COVERING THE COST OF EDUCATION AND RELEASING RESOURCES

A policy that requires some or all social groups to pay for the education they receive is doubtless a radical departure from the principle of free education. The fiscal revenue derived from such measures depends on the social structure of each country and its stage of educational development. Furthermore, it must be assumed that such revenue would vary over time, from what might be termed the phase of initial impact to the point when a new adjustment or balance is achieved. After the initial impact stage, maintenance of the initial fiscal results will probably depend on the timely adoption of supplementary policies; otherwise, the adjustment phase could substantially reduce the amount of public sector resources released for specific educational development purposes.

In other words, unless supplementary measures are adopted, and depending on the individual circumstances of each country, the pendulum would probably swing from a resource-release phase to a later stage in which the public sector would free itself from its educational obligations toward the higher-income group. Thereafter, the public education system would confine itself to meeting the needs of the other social sectors. At the same time, it must be understood that the additional resources would dry up the minute these new commitments became permanent.

1. Assumptions made for computing purposes and global amounts

One of the principal assumptions used in these estimates is that the percentage of students enrolled per family does not vary significantly by income level, except for the differences resulting from the drop-out rates that affect all groups. This assumption may not result in complete accuracy; it was therefore deemed advisable to adjust other aspects on which more detailed information was available and whose degree of variation might have a more significant effect on the results.

For the purposes of this exercise, only the higher-income group and the total cost of education were taken into account. These estimates could be completed later by including other income brackets and payments for parts of that cost. However, it seemed somewhat premature to include those aspects, which tend to make the operation more complex without shedding additional light on fundamental problems.

Table VII-11 shows that if the proposed measures were adopted in Latin America, public resources amounting to about 14% of the total expenditure on education would be released.

More resources are generated at the higher education level, because of its cost and the large proportion of students from higher-income families.

2. Yields of higher education

Table VII-12 contains the estimates for higher education according to typical educational development situations. It would seem that, as a rule, it is in the least developed countries (situations III and IV) that the proposed measures would release a more significant proportion of resources. In any case, even in the more developed countries, the amounts are obviously not to be sneered at.

It should be noted that in situation II the percentage of funds released is lower because of the large number of private universities receiving a small subsidy from the public sector.

The ratios implicit in Table VII-12 can be better appreciated if the countries of the region are grouped according to the size of the private education sector and the relative amount of the subsidy it receives.

Although the figures in Table VII-13 show the resources released to be in inverse proportion to the size of the private sector, the effect of the relative amount of the subsidy is not clear because social structure factors intervene. In other words, the countries included in each category do not have a uniform proportion of higher-income students in the public sector.

In Table VII-14, the effect of this factor has been normalized so that the differences from the data in Table VII-13 illustrate the relative extent of the participation of higher-income students in the public education system.

A comparison of the results of Tables VII-13 and VII-14 suggests the following additional conclusion: under the conditions of educational development that characterize the region, the effect of higher-income student enrollment in the public sector on the yield of the proposed policy measures appears to be directly proportional to the size of the private sector and inversely proportional to the amount of the subsidy, as if the higher education private sector were growing in the wake of the public sector, absorbing the overflow of higher-income students dissatisfied with the quality and the quantity of the public system. In addition, the larger the subsidies provided, the larger private universities grow.

Finally, it should be noted that these conclusions partially confirm the hypotheses used as a basis for the analysis contained in the section on "Educational Development and Free Education."

3. Yields of secondary education

Table VII-16 shows the estimated amounts of resources that could be released in secondary education according to typical educational development situations. The broad trends detected in the analysis of the situation for higher education are repeated at this level. Of course, the proportions representing coverage of educational expenses by higher-income students are lower, since a year's tuition costs less and fewer students are able to pay it.

In very general terms, the proportion of resources released in secondary education can also be seen to reflect the size of the private sector, the relative amount of the subsidies, and the proportion of the higher-income group enrolled in public schools.

4. Effect of the income-scale profile

The relative size of the higher-income sector that can pay for the education received by its children is not constant. Figures and estimates for the region show the higher-income family segment in the less developed countries to be small—one-third to one-half of that in industrialized countries. Moreover, the internal distribution within this bracket is biased in favor of a few very wealthy families. While reasonably well off, most families are at the lowest level of the respective bracket. There is a wide gap between the two, and the averages therefore constitute an artificial statistic and do not reflect the real economic capacity of the families.

Under the circumstances, the fiscal revenue resulting from payment of fees is probably proportionally lower than the possible yield in more developed countries. It is also likely that while the top substratum sends its offspring to private schools—and, at the university level, possibly abroad—a significant proportion of the bottom substratum would find it hard to cover these new obligations.

The resulting corollary is self-evident. In principle, the amount of resources released as a result of this measure corresponds to the size and internal distribution of the higher-income bracket.

This leads to another important consequence. In the developed countries of the region it is easier to obtain from the middle income groups the additional funds that represent a fraction of the cost of education, whereas in the less developed countries, such sectors are not only likely to be smaller but their absolute income levels would not tolerate any further drain on the family budget.

F. RESOURCES RELEASED AND DEMOCRATIZATION OF EDUCATION: DEGREES OF URGENCY AND DEGREES OF LIBERTY

First of all, it must be remembered that both in the justification and in the direct results of the proposed policy, the objectives sought are mainly fiscal. In other words, under the existing social structure it is considered fair to collect additional funds from those who benefit most from the public education system and thus to increase the amounts necessary for expanding and improving the quality of education.

But such measures have their consequences. Although the purpose is not to use them as a means of changing the social structure, the organization and operation of the educational system clearly reflect the inequities that characterize society. Hence the impact of those measures must be appraised in terms of that fact. The use of the funds released for the specific needs of educational development then becomes a fundamental problem, particularly after the principle of universal free education is abandoned.

Payment of the cost of education can also spawn further discriminatory factors. The existence of a sizable high-quality private subsystem side by side with a low-quality public subsystem offers educational and social advantages to those who can pay for their education, while dynamic forces that tend increasingly to widen the gap between the quality of the two subsystems are generated. Furthermore, the need to provide education for the mass of the population exerts a constant pressure on the public sector that may adversely affect efforts to improve the quality of that education.

The possibility of converting the increased fiscal justice achieved through application of these measures into greater democratization of education depends, as mentioned earlier, on the direction taken by the changes in the social structure and, of course, on the type of educational development strategy.

Under present inequitable conditions, strategy options are by no means optimal; each of them represents a compromise between the goals that compete for the same public funds. The substantive question is how best to use the resources released: to improve the quality of secondary and higher education, or to raise their retention rate; to bring disadvantaged groups into primary school, or to set up a national scholarship system that will motivate lower-income students to stay in school. In principle, it would appear difficult to reconcile the general goals of extension and efficiency without making substantial sacrifices in the level of the targets aimed at.

The estimates presented show that, in principle, the amount of funds released by these measures would be substantial—about 14% of Latin American government expenditure on education. The variation according to specific educational development situations is between 12 and 17%, and in most of the small and medium-sized countries these percentages are higher than the average for the region.

The same analysis by levels of education produces even more interesting results: 22% of the expenditure on secondary education and 38% on university education. Variations according to typical educational development situations range from 15 to 29% of expenditure on secondary education and from 36 to 60% on university education.

Regardless of the value of these estimates, or of whether the internal assumptions used or the external conditions defining the scope of the computation hypotheses are changed, the undeniable conclusion is that these measures can generate substantial amounts of additional resources. Leaving aside problems of their political and administrative feasibility, which are not specifically considered in this paper, some of the principal implications of the measures warrant mention.

To assess the magnitude of the problem, it is enlightening to compare the amount of resources that can be released with some of the targets for expanded coverage of elementary education and improved retention of low-income groups already enrolled in primary schools.

Assuming that costs remain constant, attainment of the target of giving the average student a minimum of four years of schooling would require an additional expenditure of US$882 million on education in the region, i.e. 21% more than at present.

In countries where the educational system is relatively less developed, the achievement of this target—exclusively for those who are already in school—would entail increasing the total budget by almost one-third, almost double the effort required in the more advanced countries.

If, in addition, all the children now out of primary school are enrolled, the findings are even more striking. For the purposes of computation, it was assumed that the new group brought into the school system would have the same drop-out and repeater rates as are now prevalent in the first four years of primary school, and that they would then drop out permanently.

Table VII-18 shows the results of this estimate. The overall cost for Latin America amounts to US$699 million, 17.2% of the present expenditure on education. Nevertheless, the effort required varies appreciably according to the level of educational development: in the least developed countries, the additional resources required amount to almost two-thirds of the current expenditures.

These static goals, which do not even take into account the population growth rate, do give an idea of the magnitude of the constraints on any educational development strategy that attempts to reasonably respond to the challenge of achieving qualitative and quantitative targets. In the least developed situations, the imperatives of quantity and coverage are so overwhelming that considerable sacrifices in quality must be made if they are to be met. These needs are not quite so urgent in the more developed countries, so that a compromise between alternative goals is more viable.

It is here that the problem of using the funds released to democratize education arises. As the compromise between quantity and quality becomes more difficult, the options adopted will tend toward conservative postponement of the achievement of goals, especially those of promoting lower-income sectors and incorporating additional social groups into the school system. Paradoxically, it is in situation I and II countries that the additional resources obtained from the payment of fees can make a substantial contribution to the development of the educational system. In such instances, it is not simply a question of keeping the amount of resources more proportionate to the needs, but also of making educational objectives more consistent with the social structure.

Finally, it must be remembered that, unless a significant portion of the funds released are used for democratizing education, the effect of this measure might be to make the system more regressive.

APPENDIX

METHODOLOGY USED TO COMPUTE THE AMOUNT OF PUBLIC RESOURCES RELEASED FOR EDUCATION

A description follows of the group of equations that make up a simple model for analyzing the effect on the fiscal budget of increased private financing of education in Latin America. Private financing is understood to mean a larger contribution from the families of students that are in the higher income brackets.

The time and resources available for this study were not equal to handling the volume of data input required by a model that would adequately convey the complex interrelationships governing the allocation of resources—economic or social—within the family budget, on the one hand, and the factors that in turn determine the allocation of public resources—economic or political—to education. It was therefore decided to use a simplified model which, based on existing information, would produce a tentative and quantitative estimate of the implications of an alternative of the type described. In short, we attempted to provide orders of magnitude of the public resources released by taking into account the size of the private sector and the amount of the public subsidy to that sector.

To do so, we needed an indicator of the cost of secondary and higher education in both the public and the private sector. The data available and easily accessible vary, but generally speaking, coverage is erratic, both as regards the number of countries for which they exist and the educational levels for which such costs are computed and the uniformity of the methodology used to do so.[4] Similar problems are encountered with respect to educational expenditure by family and are further complicated by the fact that figures on family expenditure are not available for all countries.

Consequently, the statistical basis for applying the methodology was provided by three major sources: the OAS (7), UNESCO (10) and the various publications derived from the ECIEL study on family income and consumption between 1966 and 1972 (4, 6, 9).

On the basis of the available data, it was decided to use public expenditure on education as an approximate equivalent of its cost. Unfortunately, UNESCO figures on public current and capital expenditures on education involve problems of classification and coverage. As a rule, they include all expenditures on education made at any level: central or federal government (ministries), state, provincial and local authorities. UNESCO figures show the percentage allocated to education by level, plus a "not distributed" item that covers scholarships, subsidies, and central and local administrative expenditure where an allocation by level has not been possible.

These data were used to compute the cost per secondary and university student in 1970 in constant United States dollars of that year. Because of the serious difficulties entailed in comparing the figures on capital expenditure by level, it was decided to use only current expenditure. The possible degree of underestimation is minimal, however, since that expenditure represents a mere 7% of the total.

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[4] ECIEL Studies. Latin American Education and Development Project.

The figures on the number of students by level and the breakdown between public and private institutions came from (7) and (10). The amount of public subsidy per private school student at each level was estimated on the basis of the "not distributed" column by assuming that subsidies represented 50% of the not distributed expenditure.

It was also assumed that the student's family pays the difference between public cost and public subsidy in the private sector. Hence, the costs of maintenance, supplies and transportation are not included, nor are the fees paid by the family in the public sector. Some of the estimates for Costa Rica[5] show that such payments amount to about 8% of the total university cost, but the paucity of observations by country and the lack of any assessment of the effect of that percentage at each family income level made it advizable to omit this estimate at this stage.

The data published by Brookings-ECIEL (9) were used to estimate the figures on family life cycles and thus to determine the proportion of families with school-age children in the different educational levels.

The variables used to compute the amount of resources generated at the university level were the following:

GTeu = gastos totales en educación universitaria
(total expenditure on university education)
GGeu = gastos del gobierno en educación universitaria
(total government expenditure on university education)
GFeu = gastos de las familias en educación universitaria
(total family expenditure on university tuition)
GGeup = gastos del gobierno en educación universitaria pública
(government expenditure on public university education)
GGeupr = gastos del gobierno en educación universitaria privada
(government expenditure on private university education)
Aup = alumnos universitarios públicos
(public university students)
Aupr = alumnos universitarios privados
(private university students)
Cpu = costo por alumno universitario público
(cost per public university student
Spu = subsidio público por alumno universitario privado
(public subsidy per private university student)
h = número de hijos en edad escolar por familia según ciclo de vida de las familias
(number of school-age children per family according to family life cycle)
bu = proporción de familias con hijos en edad escolar universitaria
(proportion of families with university-age children)
NF = número de familias
(number of families)

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[5] ILPES report on its Technical Assistance Mission to Costa Rica, ILPES, June 1978.

Based on the above-mentioned assumptions, total expenditure on university-education may be described by following set of equations:

$$GTeu = GGeu + GFeu$$

Where:

$$GGeu = GGeup + GGeupr$$
$$GFeu = Aupr\,[Cpu - Spu]$$

and

$$GGeup = Aup \cdot Cpu$$
$$GGeupr = Aupr \cdot Spu$$

Hence

$$GGeu = Aup \cdot Cpu + Aupr \cdot Spu$$

and

$$GTeu = Aup \cdot Cpu + Aupr \cdot Spu + Aupr\,[Cpu - Spu]$$

The last equation shows the assumed equality of public and private sector costs, since it can be written as:

$$GTeu = (Aup + Aupr)\,Cpu$$

Application of the measure (1) (payment of the cost of university education by families in the upper-income brackets) yields the following equation:

$$GF^1eu = h \cdot bu \cdot Cpu \cdot NF$$

Therefore, the additional resources (RA) will be the result of:

$$RA = GF^1eu - GFeu$$
$$RA = h \cdot bu \cdot cpu \cdot NF - Aupr\,[Cpu - Spu]$$

Distribution of the additional resources between the public and private sector will vary in accordance with the following situations:

i) $h \cdot bu \cdot NF > Aupr$
   $GF^1eupr = Cpu \cdot Aupr$
   $GF^1eup = n \cdot bu \cdot Cpu \cdot NF - Cpu \cdot Aupr$
ii) $h \cdot bu \cdot NF < Aupr$
   $GF^1eupr = h \cdot bu \cdot Cpu \cdot NF$
   $GF^1eup = 0$

The resources released for the public sector (RLG) are computed as follows in situation (i):

$$\text{RLGi} = \text{GGeu} - \text{GG}^1\text{eupi} \ \text{ since}$$
$$\text{GG}^1\text{eupri} = 0$$

and where

$$\text{GG}^1\text{eupi} = \text{Cpu}\,[\text{Aup} + \text{Aupr} - \text{h} \cdot \text{bu} \cdot \text{NF}]$$

in situation (ii):

$$\text{RLGii} = \text{GGeu} - \text{GG}^1\text{euii}$$

where:

$$\text{GG}^1\text{euii} = \text{GG}^1\text{eupii} + \text{GG}^1\text{euprii}$$
$$\text{GG}^1\text{eupii} + \text{Cpu} \cdot \text{Aup}$$
$$\text{GG}^1\text{euprii} = \text{Spu}\,[\text{Aupr} - \text{h} \cdot \text{bu} \cdot \text{NF}]$$

Therefore:

$$\text{GG}^1\text{euii} = \text{Cpu} \cdot \text{Aup} + \text{Spu}\,[\text{Aup} - \text{h} \cdot \text{bu} \cdot \text{NF}]$$

This way of computing the resources released also assumes that, when this measure is applied, potential paying students are enrolled in the private sector and when (h · bu · NF) is greater than (Aupr), the rest are enrolled in the public sector. In both this and the inverse case, the amount of government resources granted to the private sector equals the total subsidy corresponding to the number of private students covered by the potential payers.

The method used at the university level was applied to the secondary level with the following variables:

GTes = gastos totales en educación secundaria
(total expenditure on secondary education)
GGes = gastos del gobierno en educación secundaria
(total government expenditure on secondary education)
GFes = gastos de las familias en educación secundaria
(family expenditure on secondary education)
GGesp = gastos del gobierno en educación secundaria publica
(government expenditure on public secondary education)
GGespr = gastos del gobierno en educación secundaria privada
(government expenditure on private secondary education)
Asp = alumnos secundarios públicos
(public secondary school students)
Aspr = alumnos secundarios privados
(private secondary school students)
Cps = costo por alumno secundario público
(cost per public secondary school student)

Sps = subsidio publico por alumno secundario privado
(public subsidy per private secondary school student)
h = número de hijos en edad escolar por familia según ciclo de vida de las familias
(number of school-age children per family according to family life cycles)
bs = proporción de familias con hijos en edad escolar secundaria
(proportion of families with secondary school-age children)
NF = número de familias
(number of families)

The customary comments deploring the quality and scope of data available for conducting this type of study hardly need to be repeated here. However, it should be noted that this deficiency precludes the designing of methodologies that afford a more detailed explanation of the phenomena studied. We therefore believe that there is abundant room for research, both on the preparation of statistical data and on the construction and computation of more explanatory models. Accordingly, this effort to supply some tentative figures is limited by both types of constraints . . . the existence of which we are the first to acknowledge.

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STATISTICAL APPENDIX

Table VII-1. Percentage Breakdown of Enrollment, Government Expenditure, and Unit Costs by Educational Level in Latin America Circa 1970

Educational level	Percentage of: Enrollment*	Percentage of: Public expenditure**	Unit Cost***
Primary	78.4	50.1	45.7
Secondary	18.8	24.6	121.8
University	2.8	25.3	747.5
Total	**100.0**	**100.0**	—

Source: Estimates based on national statistics.

*Includes students in both public and private institutions.

**Direct and current capital expenses.

***Direct cost for each public-school student in 1970 dollars.

Table VII-2. Percentage Breakdown of Enrollment by Income Bracket and Educational Level in Latin America Circa 1970

Income level	Educational level: Primary	Educational level: Secondary	Educational level: University
Lower[a]	76	(–)	(–)
Lower middle[b]	20	85	(.)
Upper middle[c]	2	7	47
Higher[d]	2	8	53
Total	**100.0**	**100.0**	**100.0**

Source: Estimates based on country statistics.

(.) Less than 1%.

[a] Broadly speaking, the lower-income group represents 65% of the families and 23–32% of income. For purposes of this calculation, the out-of-school population (20% of the families and 3–7% of income) was excluded, which left a group comprising 45% of the families and 20–25% of income.

[b] 20% of the families and 15–20% of income.

[c] 10% of the families and 15–20% of income.

[d] 5% of the families and 30–40% of income.

Table VII-3. Breakdown of Enrollment and Public Expenditure on Education by Income Brackets Circa 1970

Income groups	Percentage of: Enrollment	Percentage of: Public expenditure
Lower	59.7	34.4
Lower-middle	32.1	33.9
Upper-middle	3.9	14.9
Higher	4.3	16.8
Total	**100.0**	**100.0**

Source: Estimates based on country statistics.

Table VII-4. Average Number of Years of Schooling and Average Public Expenditure Per Student During His School Life by Income Group

Income	Average years of schooling	Average public expenditure per student (in 1970 US$)
Lower	2.47	113.0
Lower-middle	8.64	596.0
Upper-middle	14.25	2.687.0
Higher	17.00	4.743.0

Source: Estimates based on country statistics.

Table VII-5. Indicators of Scope and Efficiency by Educational Level and Typical Educational Development Situation

Typical situations (A)	Primary (%)				Secondary (%)			University (%)		Weighted enrollment ratio Students per 1000 inhabitants (**)
	Enrollment ratio (*)	Average annual drop-out rate	Repeater rate	Overage students	Enrollment ratio (*)	Average annual drop-out rate	Overage students	Enrollment ratio	Average annual drop-out rate	
I	85+	9.0	10.0	20.0	33–45	11.0	35	7–10	9.0	141
II	75–84	13.0	20.0	40.0	20-25	12.0	60	4–6	9.0	113
III	65–74	13.0	20.0	60.0	15–19	12.0	70	3–6	9.0	105
IV	50–64	13.0	20.0	60.0	5–14	13.0	70	1–3	14.0	83

Source: Estimates based on country statistics.
*Adjusted enrollment ratios.
**Weighted by population age structure.
(A) Statistics from the following countries were used to delineate typical situations:
Situation I: Argentina, Chile, Costa Rica, Panama, Peru and Uruguay.
Situation II: Brazil, Colombia, Ecuador, Mexico and Venezuela.
Situation III: Bolivia, Dominican Republic, Nicaragua and Paraguay.
Situation IV: El Salvador, Haiti, Honduras and Guatemala.

The recent rapid increase in enrollment in Panama, Peru, Venezuela, and the Dominican Republic places these countries at midpoint between the typical educational development situations used in this study.

Table VII-6. Percentage of Students in the First and Last Year of Each Educational Level, Classified by Income Groups

Income level	Primary		Secondary		University	
	First year	Last year	First year	Last year	First year	Last year
Lower	93	71	(–)	(–)	(–)	(–)
Middle	6	25	91	60	10	5
Higher	1	4	9	40	90	95
Total	100	100	100	100	100	100

Source: Estimates based on country statistics.
(–) Less than 1%.

Table VII-7. Percentage of Students in the First and Last Year of Each Educational Level, Classified by Income Group

Income Level	Educational Levels (%)					
	Primary		Secondary		University	
	First year	Last year	First year	Last year	First year	Last year
Situation III						
Lower	92	67	(–)	(–)	(–)	(–)
Lower-middle	6	26	88	59	—	—
Upper-middle	1	3	6	20	70	27
Higher	1	4	6	21	30	73
Total	100	100	100	100	100	100
Situation II						
Lower	89	57	(–)	(–)	(–)	(–)
Lower-middle	11	35	92	71	(–)	(–)
Upper-middle	1	4	4	14	64	47
Higher	1	4	4	15	36	53
Total	100	100	100	100	100	100
Situation I						
Lower	85	65	(–)	(–)	(–)	(–)
Lower-middle	12	28	89	68	(–)	(–)
Upper-middle	2	4	6	18	73	32
Higher	1	3	5	14	27	68
Total	100	100	100	100	100	100

Source: Estimates based on country statistics.
(–) Less than 1%.

Table VII-8. Average Amount of Public Funds Spent on Each Student During His School Life, Broken Down by Income Group and Typical Educational Development Situation

Income level	Situation (1970 US$)			
	I	II	III	IV
Lower	208.0	119.0	81.0	94.0
Lower-middle	862.0	584.0	415.0	649.0
Upper-middle	2,813.0	2,984.0	1,532.0	2,279.0
Higher	4,547.0	5,459.0	2,601.0	3,752.0

Source: Estimates based on country statistics.

Table VII-9. Estimated Proportion of the School-Age Population Receiving Primary Education, Broken Down by Urban and Rural Areas and Typical Educational Development Situation

Area	Typical situation*			
	I	II	III	IV
Urban	97	90	86	78
Rural	75	60	51	40

Source: Estimates based on country statistics.
*Percentage rates adjusted.

Table VII-10. Percentage of Population Aged 6 to 15 Years and of That Age Group Not Attending School, by Typical Educational Development Situation

Typical Situations	Population aged 6 to 15 years	Population aged 6 to 15 years not attending school
I	19.0	11.1
II	69.4	69.4
III	5.2	7.4
IV	6.4	11.9
Total	**100.0**	**100.0**

Source: Estimates based on country statistics

Table VII-11. Estimated Resources Released in Secondary and Higher Education in Latin America Circa 1970

Resources released

Level	1970 US$ millions	% of expenditure on level	% of overall expenditure on education
Secondary	192.4	22.6	5.5
University	307.0	37.9	8.8
Total	**499.4**	—	**14.3**

Source: Estimates based on country statistics.

Table VII-12. Estimate of Resources Released in Higher Education in Latin America Circa 1970, According to Typical Educational Development Situation

Resources released

Typical situations	1970 US$ millions	% of expenditure on level	% of expenditure on education
Situation I	109.9	38.0	9.4
Situation II	178.8	36.8	8.4
Situation III	10.2	44.7	9.2
Situation IV	8.1	60.1	10.0

Source: Estimates based on country statistics.

Table VII-13. Estimate of the Proportion of Resources Released in Higher Education in Latin America Circa 1970, According to the Size of the Private Education Sector and the Relative Amount of the Subsidy It Receives

Relative amount of subsidy	Size of private sector		
	Small	Medium	Large
High	72.6	43.7	36.8
Low	60.7	34.5	24.4

Source: Estimates based on country statistics.

Table VII-14. Normalized Estimate* of the Proportion of Resources Released in Higher Education in Latin America Circa 1970, According to the Size of the Private Sector and the Relative Amount of the Subsidy It Receives

Relative amount of subsidy	Size of private sector		
	Small	Medium	Large
High	52.0	19.5	8.8
Low	41.0	11.5	5.5

Source: Estimates based on country statistics.

*The proportion of high-income students in public universities was used as a normalization factor.

Table VII-15. Percentage of Resources Released in Higher Education That Can Be Attributed to the Enrollment of High-income Students in the Public Sector, According to the Size of the Private Sector and the Relative Amount of the Subsidy

Relative amount of subsidy	Size of private sector		
	Small	Medium	Large
High	29.0	56.0	77.0
Low	32.0	67.0	77.5

Source: Tables VII-13 and VII-14.

Table VII-16. Estimate of Resources Released in Secondary Education in Latin America Circa 1970, According to Typical Educational Development Situation

Typical Situations	Resources released		
	1970 US$ millions	% of expenditure on level	% of total expenditure on education
Situation I	92.3	29.4	7.9
Situation II	90.7	18.3	4.2
Situation III	7.4	26.4	6.7
Situation IV	2.0	15.4	2.5

Source: Estimates based on country statistics.

Table VII-17. Estimate of Additional Resources Needed If the Entire Latin American Primary School Population Is To Receive a Minimum of Four Years of Schooling, According to Typical Educational Development Situation

Typical Situations	Additional resources needed to guarantee a minimum of 4 years of schooling to all: 1970 US$ millions	As % of expenditure on level	As % of total educational expen.
Situation I	202.5	32.0	15.7
Situation II	617.2	45.9	21.5
Situation III	32.6	49.9	27.2
Situation IV	29.9	56.9	29.8
Latin America	**882.2**	**48.1**	**21.7**

Table VII-18. Estimated Additional Resources Needed to Provide Primary Education for the Population Not Now Covered*, by Typical Educational Development Situation and for Latin America as a whole

Typical Situations	Additional resources needed: 1970 US$ millions	As % of expenditure on level	As % of total educational expenditure
Situation I	104.7	16.5	8.1
Situation II	496.9	35.0	16.4
Situation III	33.7	81.6	28.1
Situation IV	63.8	119.3	63.5
Latin America	**699.1**	**38.1**	**17.2**

*Assuming that drop-out and repeater rates will be equal to the present average rates for primary education and that the remainder will leave school at the end of four years.

Table VII-19. Estimated Percentage Increase in Education Budget Required to Meet Specific Goals of Enrollment and Retention and Percentage of Resources Released, According to Typical Educational Development Situation

Typical Situations	Additional percentage in education budget needed to: (1) Guarantee a minimum of 4 years of education	(2) Enroll groups out of primary school	(3) (1) + (2)	% represented by resources released as a result of payment of secondary and university fees
Situation I	15.7	8.1	23.8	17.3
Situation II	21.5	16.4	37.9	12.6
Situation III	27.2	28.1	55.3	15.9
Situation IV	29.[illegible]	63.5	93.3	12.5

CHAPTER VIII

Financial Implications of Changes in Basic Education Policies

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With the assistance of Carlos Clavel,
Carmen Luz Latorre, and Maria Clara Grossi

INTRODUCTION

One of the distinguishing features of the formal education sector has been the lack of any significant changes in educational technology for a considerable time. For example, it does not seem possible to alter the student/teacher ratio. In addition, no thorough study has been made of its operation or of the factors that determine its efficiency. However, there has been an important change in the type of studies made since the mid 1960's when the increasing sophistication of computer capabilities first made possible the multivariate analysis of large student samples.[2] As a result, a considerable number of studies on the "production function" in education[3] have been made.

Some of these new studies have made it possible to select a certain number of key variables in the process of attaining certain scholastic achievements,[4] while at the same time raising reasonable doubts about numerous myths concerning the operation of the education system; others have made it possible to detect certain er rors in the gathering of continuous statistics, such as those on repeating, with the result that the traditional view that the problems were largely due to factors unconnected with the work of educators has been revised.[5]

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[1] Economist, Research Fellow, CIDE, Santiago, Chile.

[2] The Coleman Report marked the beginning of this era, because of the deeply felt impact of its discussion of facts and methodology.

[3] See, for instance, the reference in Schiefelbein, E. and J. Simmons. *The determinants of school achievement: a review of the research for developing countries.* Educational Research and Advisory Group, IDRC, mimeographed, Canada, July 1978.

[4] Schiefelbein, E. *Research results and decision making: the case of Educational Production Functions in Latin America.* CIDE-PILE.

However, as the new studies have normally been based on cross-section samples, precise relationships have not been established, except in the case of personal characteristics such as sex or age. The relative uncertainty of the results has led to very few of them being applied,[6] the apparent security of not changing the traditional policies being preferred. This probably explains why efforts have been centered on continuing to do what was done in the past. The outcome has been a significant growth in enrollments and a bunching of students in the first grades of the school system, where they repeat a number of times until they ultimately leave the system.

Besides looking at these problems, this study will propose solutions that have been suggested by the findings of recent research on the functioning of Latin America's educational systems. Their application, as with that of any policy, implies a certain degree of uncertainty, since it would not be possible to control all the factors governing a given set of circumstances. Nevertheless, these solutions represent possible ways of approaching traditional problems from a different angle.

A. THE REPEATING AND DROP-OUT PROBLEM

Despite the efforts made to reduce the repeater rate, *one out of every two children that enter the first grade* of the school system is a repeater.[7] A more serious problem cannot be envisaged. In this section we shall therefore deal in some detail with the factors that affect it.

On the one hand, the supply of education is limited by such factors as installed capacity (number of places, space per student and additional facilities); characteristics of the teaching staff (training, specialities, advanced training, sex and social origin); availability of teaching materials, curricula and study programs; nutrition (of the child and expectant mother), health services and other types of social welfare; changes in school timetable and organization; use of students, family members or other persons from the community as teachers' aides; credit for community work; use of mass communications media; training prior to entry into the formal system; and changes in the promotion and evaluation systems.

From the point of view of the demand for education, the following factors that affect repeating can be mentioned: education of the head of the household, income level, size of family group, availability of television and certain housing services (gas, water, electricity, telephone, heating and sewerage), number of rooms in the household, organization of the household, and quality of the education available.

It is easy to see that there are various points in common between the two concepts; but it is not easy to isolate the effects of the one or the other type of factors. Policy measures have tended to have a greater effect on the factors conditioning supply, especially physical capacity and number of teachers, as opposed to measures that might bring about some change in the demand curve.

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[5] Schiefelbein, E. Repeating: An overlooked problem of Latin American Education, *Comparative Education Review*, Vol. 19, No. 3, October 1975.

[6] IDRC, *Education Research Priorities: a collective view*. International Development Research Centre, Canada, 1978.

[7] Schiefelbein, E. Repeating: an overlooked problem of Latin American Education. *Comparative Education Review*, Vol. 19, No. 3, October 1975.

1. Scholastic achievement factors

Table VIII-1 summarizes the research findings available in Latin America on this subject.[8] They reveal considerable variability both as regards whether or not there is any relationship between specific factors and scholastic achievement and as regards the nature of any such relationship if it exists.[9]

Even where the findings appear to coincide most, as with the lack of effect of class size on achievement,[10] there are ceses where this would not be valid.[11] In most of the cases the studies do not explain more than 30-40% of the variation in achievement.

This suggests that (in addition to measurement errors) there are other factors that have not been explicitly considered in the equations but which play an important role in what each individual learns. In any event, Table VIII-1 makes it possible to take into account the factors which on various occasions have appeared to be significant in determining scholastic achievement.[12] However, their probable impact on this achievement cannot be estimated.

2. Factors deriving from the demand for education

There are fewer studies on the demand for education or on student attrition. Table VIII-2 presents a set of regressions that explain the number of years of education attained by Chilean children in each age group as a function of eight independent variables.[13] Most of them, unfortunately, cannot easily be modified by education policies since they reflect characteristics of the family that are connected with its social and economic position. However, these equations suggest that the country's general level of development, which is reflected in the socio-economic level of the families, the number of rooms per person or expenditure on food and education, will exercise an influence on any increase in the number of children retained in the school system.

In any event, if there were other studies, they would probably reach conclusions similar to those derived from Table VIII-1, i.e., that variables that have a significant impact in a given case may not do so in other circumstances, so that these results cannot be used mechanically; each case must be studied and solutions suggested where there is uncertainty.

Neither are more specific and precise data obtained from the studies that directly examine the reasons for attrition. While there are a larger number of studies on the reasons for attrition,[14] most of them simply present the views of teachers[15] or of students[16] on why they have dropped out or, in some cases, the opinions of the dropouts.[17] Table VIII-3 presents the opinions of a group of students on the causes for dropping out. Table VIII-4 presents an analysis (for a similar sample) ranking the factors that had the greatest weight in motivating a part of the sample to continue with their studies and those that prompted the others to drop out. It is interesting to compare these two tables. For the first group the leading reason was economic, "Would like to work", whereas for the second it was "low average marks in the eighth grade".[18] These two replies may well be complementary, i.e., those who drop out want to start working because they have not been doing well in their studies. If this is the case, it should be stressed that improved achievement (or less repeating) would favor an increase in retention in the system. Moreover, in both tables socio-economic factors (i.e., family can no longer continue paying cost of education) take second place and carry significant weight; in other words, these data confirm what the regression states to explain the demand for education (Table VIII-2).

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[8] A detailed analysis of the results in presented in Schiefelbein, E. *Research Results and Decision Making: the case of Educational Production Functions in* Latin. CIDE-PILE, 1978.

[9] The lack of consistency in the results may be due as much to problems with measuring the variables as to the fact that each society may have specific characteristics that change the effect of certain factors. Similar results have been obtained for the rest of the regions. See Simmons, John and Leigh Alexander. The determinants of School Achievement: Research in Developing Countries, *Economic Development and Cultural Change*, January, 1978.

[10] Harris, Richard. *Research Evidence Regarding the Impact of Class Size on Pupil Academic Achievement.* Superintendent, Maricopa Country School, Phoenix, Arizona.

[11] Haddad, Wadi. *Educational Effects of Class Size.* World Bank, Washington, D.C., March 1977.

3. How can repeating be reduced?

A review of the pertinent research has not provided a clear answer to the problem of reducing repeating or dropping out. However, some pointers have been obtained for selecting certain of the most promising variables for coming to grips with the problem, while it has proved possible to establish a relationship between the two problems.

This implies that one cannot speak of *an* education demand curve or *an* education supply curve since each school population, depending on its characteristics, generates a demand and has to meet a particular supply, i.e., there is a "specific market" in each case.

Four of the primary factors determining the type of market in which a given individual participates in the different developing countries can be presumed to be: (1) country or community in which he lives; (2) socio-economic group to which he belongs; (3) area where he lives, considering basically the urban/rural ratio of the area; and (4) ethnic group to which he belongs.

The different socio-economic groups show very different repetition and

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[12] It is important to point out that Table VIII-1 presents a finding that has been observed in a number of countries: repeating does not solve learning problems. Students that have repeated once tend to continue to have poor scholastic results.

[13] In view of the nature of this type of study, it is impossible to make the variables sufficiently independent, so that their explanatory potential is probably overestimated.

[14] More aggregated studies are available on the relationship between socio-economic level and dropping out. See for instance the studies by Salas, Irma and Eduardo Hamuy in CPU No. 35, Santiago, 1975.

[15] These opinion studies are quite frequently made. See for example, OAS Multinational Education Research Project. *Some Aspects of Academic Achievement.* DIEPE, Argentina, 1976.

[16] Fisher, Joseph C. *Factors associated with college aspirations and expectations of Chilean secondary school pupils.* Doctoral thesis, Chicago University, Education Dept., 1972, p. 59. Summary in CPU publication No. 35, Santiago, 1975.

[17] Schiefelbein, E. and J. Farrell. *Final Report, Phase I. Tracer Study Chile.* CIDE, Working Documents No. 8, Santiago, 1978.

[18] "Low marks" ranks fifth in Table VIII-3.

dropout rates, which become much higher as one goes down the socio-economic scale. Thus we must separate out the socio-economic group to which each measure is directed in seeking to analyze the impact of the different measures.[19] Special attention will be paid here to the groups in extreme poverty, since these are the ones that show the highest repetition rates.

Where an individual lives, how close he is to a major urban center, governs to a large extent the educational possibilities open to him since it is in the chief towns and cities of each country that the educational and cultural facilities are best. There can be no denying the immense difference in the opportunities available in the urban and in the rural sectors, or the equally large difference in the demand for education in these sectors.

Ethnic characteristics may have a greater or lesser impact depending on the country or community concerned; in certain cases they may be the determining factor as regards what is or is not open to an individual. This is the case with Chile's Mapuche population (it is more important to bear in mind that they are Mapuches than to divide them into socio-economic groups or ascertain whether they live in urban or rural areas, if one is seeking to devise measures that will encourage them to remain in school).

Another factor that must be considered when thinking in terms of specific measures is the age variable, which places certain constraints on the range of steps that can be taken. These factors suggest that one cannot assume, *a priori*, that one single approach or combination of approaches will suffice; rather each of the groups that is to be served must be identified and specific measures then tailored for them (in other words, the aim will be to affect a population with very specific homogeneous features).

4. Some possible alternatives

When the situation in each of the countries selected as "cases" in this study is analyzed, a set of measures considered appropriate for each will be proposed. However, some possible alternatives should first be mentioned, albeit summarily, although they will not necessarily be advocated for the cases considered.

a) *Pre-school education*

Latin America's high repetition rates in the first grade appear to be connected with a low level of stimulation during early childhood, adaptation difficulties in a group other than the family, and the lack of certain habits deemed essential by teachers.[20] Since it is very hard to change the teachers' attitudes as to "what should be taught or learned in first grade", it is perhaps easier to offer this first year in a different form, i.e., as a preprimary course. In this way, (as a recent study on the Ypsilanti-Perry project suggests[21]), it could help solve the immediate problem of making it through first grade.[22]

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[19] The low visual perception in discrimination and spatial orientation in a group of Chilean pre-school age children was connected with the lower socio-cultural level of their families (see Pollack, Gloria and G. Luchini. *Capacidades perceptuales en preescolares de diferentes estratos socioculturales.* The Research Fund of the Catholic University of Chile, Santiago, 1974). There are also apparently differences in weight, and scholastic achievement (see Milicic, N. and P. Tschorne. Análisis de una experiencia docente universitaria en dos colegios de diferente estratificación social de Santiago. *Revista Latinoamericana de Psicología*, No. 7, 1975).

[20] A correlation of 0.78 has been found between the proportion of first-grade pupils who attended preprimary school, in each province of Chile, and the first-grade repetition rate. See Filp, J. and C. L. Latorre. *Antecedentes sobre la educación prebasica en Chile.* CIDE, 1978.

Another form of pre-school education designed to reduce the traditional repeating rates could be the creation in the primary schools of a "preprimary" grade in which the pupils could learn to live together, master certain minimum motor skills (such as holding a pencil), and familiarize themselves with materials such as paper, glue, and the like. This would overcome the problem of the teachers' still insisting that the children know something of reading and writing by the end of the first year. There would not be any examinations at the end of this preparatory year so the teachers would not have any professional scruples about passing on a child who was "not ready" for the next grade. There would be greater freedom to serve the children's interests and no pressure to complete a given program.

b. Modification of promotion procedures

A variation of the type of solution discussed in the preceding item is to organize the children's studies by "grade cycles" in such a way that they progress at their normal rate through this period (three or four years). This can be supplemented with various types of remedial teaching during vacations or at the start and finish of the school year. This latter solution could be used as a supplement to other types of policies. Children of normal intelligence but with a somewhat slower learning speed can greatly improve their scholastic achievement if their school year is longer or more intensive than that of their fellows. That is to say, they can have more class hours during the school year in the subjects in which they are weak, or vacations can be shortened.

c. Nutrition

There are other supplementary aspects of preschool education. Among these, nutrition appears to be of key importance. Although the data available do not allow of certainty regarding the effect of malnutrition on scholastic achievement,[23] it is safe to assume that it can affect ability to concentrate on school work, besides making it more likely that a child will lose school time through sickness, all of which can have an impact on readiness for promotion since most school systems require a certain number of days of attendance for promotion to the next grade.

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[21] Schwimhart, L. and D. Weikart. Puede la educacion pre-escolar producir una diferencia duradera en el futuro educativo del nino? *Educacion Hoy,* Ano VII, No. 42, 1977. The project mixed half a day of classes for five days a week with half a day's instruction at home once a week.

[22] Although the impact on IQ tends (in the first experiments) to disappear after 3 or 4 years, scholastic achievement increases continuously; whereas 49% reached the fifth grade, only 17% of students who had not attended preprimary school did so. The impact of preprimary school appears to extend into adult life (and to the mothers). See New Optimism about Preschool Education, Three Reports from Ypsilanti Michigan, *Carnegie Quarterly,* Vol. XXVI, No. 3, Summer 1978, pp. 5–8 (Monographs: The Ypsilanti Perry Preschool Project: Preschool years and longitudinal results through fourth grade; The Ypsilanti Preschool Curriculum Demonstration Project: Preschool Years and longitudinal results; An Economic Analysis of the Ypsilanti Perry Preschool Project, (The High-Scope Educational Research Foundation).

[23] Monckeberg, F. and E. Schiefelbein. Nutrición y Educación, *Educación Hoy,* Ano IV, No. 19, 1974.

d. Creches

These are more difficult to justify in terms of reducing repeating. However, they can be important in the case of some working mothers who, if these facilities are not available, have to leave their babies and infants in the care of their older children, who consequently do not regularly attend school.

e. Parent-training program

Proper training for parents has led to advances in the intellectual level of children similar to those obtained in kindergartens,[24] the advantage being that parents trained in this way can do the same thing for subsequent children, while they themselves also benefit. This alternative is of special interest in Latin America and should be systematically explored in the future.[25] The training given to parents can be a means of preventing many cases of mental retardation,[26] with the result that both the problems these cause in the classroom and the need for subsequent (highly expensive) treatment can be reduced.

f. Early stimulation by television programs

Programs such as "Sesame Street" and "The Electric Company" have been devised in developed countries and have proved quite effective in bringing about substantial improvements in acquiring skills such as relating concepts of location in space or time; classifying and selecting different objectives according to various criteria; making multiple classifications based on different simultaneous characteristics; drawing inferences; separating the words in a sentence; recognizing words in different contexts; relating letters and sounds; naming letters, etc. In all these cases the children who watch most, learn most. The skills the program stresses are those that are learned best;[27] younger children are the ones who obtain relatively better results, but the program tends to increase differences deriving from background when two children with different backgrounds watch for the same time under the same conditions ("knowledge gap"). In experiments carried out in Chile and Mexico, it was found that children exposed to Sesame Street show better achievement than those who do not watch the program.[28] Follow-up studies show that the children who watch, also adapt better to school later on. It should be underscored that this type of program does not require adult supervision.[29]

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[24] Filp, Johana *et al.*. Educación preescolar en el kindergarten o en el hogar. *Revista del Centro de Estudios Educativos.* Vol. VII, No. 4, 1977.

[25] Whelan, G. *et al.* El Proyecto Padres e Hijos: un programa de educación familiar y comunitaria para el desarrollo del niño rural en Chile. *Educación Hoy.* Vol. 7, No. 4[illegible]. 1977. One of the most serious effects of socio-cultural deprivation appears to be language problems, see Gazmuri, C. and G. Lopez. Caracterización de algunos problemas de rendimiento escolar de niños en condiciones de privación psicosocial. Degree Seminar, Master of Education, Catholic University of Chile, Santiago, July 1978.

[26] General Accounting Office (GAO). *Preventing Mental Retardation—More can be done.* U.S. General Accounting Office, 1977.

[27] Bogatz, G. A. and S. A. Ball. Some things you've always wanted to know about Sesame Street. *American Education.* April 1971. Other references and a more detailed description of the project are given in Schiefelbein, E. Plaza Sesame: mutacion social y tecnologia educacional. *Educacion Hoy.* Vol. III, No. 16, 1973.

g. Radio programs

Radio programs appear to be effective in the direct transmission of certain basic concepts.[30] There have also been a large number of training experiments using monitors, who cooperate in the utilization of the learning experiences generated by the programs.[31] Radio could be used to train mothers of children between 0 and 2 years of age in order to stress the importance of proper stimulation in the first months of life and, later, of starting school at the right age. It could also be employed to encourage mothers to cooperate in school activities and make them aware of the need to maintain continuous contact regarding their children's progress.

h. Use of parents, older students, and other members of the community as tutors, particularly for remedial activities

Various studies have shown that unqualified personnel can be used to support the teacher's work. These have tended to center on the parents;[32] however, other community members, including children in higher grades, could also provide valuable assistance while at the same time gaining worthwhile experience for themselves. One of the activities in which such persons have been found to be especially effective is in providing special coaching for children with learning problems (remedial tutoring).[33]

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[28] Salas, Sonia. Análisis descriptivo de funciones básicas del niño chileno a traves de un programa de televisión, PILE, 1975; Diaz-Guerrero, R. and W. H. Holtzman. Learning by Televised 'Plaza Sesame' in Mexico. *Journal of Educational Psychology.* Vol. 26, No. 2, Spring, 1976, pp. 145–154.

[29] A subsequent evaluation made in Mexico of a larger sample showed little impact. The authors suggest that some supervision or reinforcement by parents or adults living with the family may be required. See Diaz-Guerrero, R., I. Reyes, D. B. Witzke and W. H. Holtzman. Plazo Sesame in Mexico: an evaluation. *Journal of Communication.* Vol. 26, No. 2, Spring, 1976; pp. 145–154.

[30] Gonzalez, E., C. Morel, V. Fuenzalida and C. Aguilar. *Efectividad de la radio para difundir conceptos basicos.* School of Communications Arts. DEPAL and Office of Vice Rector of Communications, Cath. Univ. of Chile, March 1977. A summary is given in *Revista del Centro de Estudios Educativos.* No. 2, 1978.

[31] Acevedo, R. and G. Gutierrez. Educación radiofónica en América Latina: situación actual y una sugerencia de optimización, *Education Bulletin* No. 78, UNESCO, Santiago, 1975.

[32] Magendzo, A., M. Messina, S. Nissim and A. M. Zuniga. Padres voluntarios. *Cuadernos de Educación.* No. 40, CIDE, October 1974; Vaccaro, L., E. Schiefelbein and C. Yanez. Una experiencia de participación de la familia en el proceso educacional: descripcion de diecisiete actividades realizadas por apoderados en una escuela básica gratuita. *Educacion Hoy.* Ano VII, Nos. 37–38, 1977; Castillo, Gabriel. El cuarto G. *Educacion Hoy.* Ano V, No. 30, 1975.

[33] Other aspects of participation by parents can be examined in: Beattie, Nicholas. Parent Participation in French Education, 1968-1975. *British Journal of Educational Studies.* Vol. XXVI, No. 1, Feb. 1978. See also Cronin, J. Parents and Educators: Natural Allies, *Kappan.* 59–4, 1977.

i. Curriculum changes (elimination of compulsory subjects)

It appears possible, these days, to adapt the curriculum in such a way as to foster the development of all children without exception.[34] For children with learning problems, efforts should be centered on the instrumental subjects, i.e., Spanish and mathematics, which serve as tools for others that do not require prior mastery of other concepts or skills. If the children are able to overcome the obstacles in these two subjects, they could be promoted and incorporated into the regular work of the next grades.[35]

j. Teacher training

The relationship between teacher training and student achievement is not clear, although in some cases[36] it appears warranted to assume that the better the teacher's training, the better on average is student achievement. The situation is even less clear for the upgrading of teachers.[37] However, the available evidence indicates that such training does modify teacher behavior.[38] In any event, various forms of initial and in-service training are available for teachers. Among them, consideration should be given to using mass communications media[39] (especially TV, radio and newspapers) and programmed instruction materials[40] and also other methods such as supervision and intensive courses and seminars. Finally, it should be noted that the proper selection of teachers for such training may be beneficial since, in certain subjects, the social background of the teacher can facilitate his work. Obviously, a better selection could be made if the salaries paid were to attract better candidates.

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[34] Castillo, Gabriel. *Proyecto Escuela para Aprender. Primer Informe.* CPEIP, Lo Barnechea, 1975; Castillo, G. *Curriculum universalista en la ensenanza basica.* Study Papers No. 50, School of Education, Univ. of Chile, Jan. 1978. See also Heyneman, S. *Planning the equality of educational opportunity between regions.* Education Department, World Bank.

[35] It was noted in Chile that spelling was a major criterion in promotion in Spanish. Curricula were later designed which lessened problems of this type for students in second through sixth grade of primary school. Ferandez, J. and G. Lopez, *Programa experimental de ortografía aplicado a una muestra de estudiantes de ensenanza basica,* PIIE, 1977.

[36] It can be seen from Table VIII-1 that the studies of Rivarola in Paraguay, Echart in Argentina, Costa in Brazil and Purves, Kiees and Comber in Chile show that teacher training has a positive impact.

[37] Table VIII-1 shows that Echart's studies in Argentina and those of Schiefelbein-Farrell in Chile did not find significant relationships. However, this might depend on how the teachers are selected and the type of training (worksnop, visits or traineeships and work supervision).

[38] Andraca, A. M. Análisis de algunos resultados de una reforma curricular: el caso de Chile. *Revista del Centro de Estudios Educativos,* VIII, No. 2, 1978.

[39] Magendzo, S. and L. E. Gonzalez. El impacto de un programa de capacitación de profesores a traves de la TV y diario. *Revista de Tecnologia Educativa,* No. 2, Vol. 3, 1977; Acevedo, R. and A. M. Andraca. *Plan de teleducación de Televisión Nacional de Chile; estudio descriptivo y analisis de la población inscrita.* CIDE, 1976,

[40] Magendzo, S., M. Martelli, S. Rittershausen and A. Vergara. La detección y rehabilitación de niños con problems de rendimiento escolar, *Educación Hoy,* Ano V, Nos. 25 and 26, 1975. See also Magendzo, S., M. Martelli and S. Rittershausen and A. Vergara. Utilización de técnicas adquiridas a traves de un curso programado para detectar y rehabilitar niños con problemas de aprendizaje en la sala de clase. *Revista de Tecnología Educativa,* Vol. 3, No. 1, 1977.

k. Availability of textbooks and teaching materials

A number of studies have noted the positive impact of textbooks on scholastic achievement.[41] Ensuring that each child has the right textbooks and workbooks for the curriculum planned could be an important factor in reducing learning problems. Not only does it facilitate the teacher's actual teaching work by reducing the amount of time that has to be spent dictating or copying on the blackboard, it also enables the children to get on with their work themselves, at home as well as in class.

l. Ease of access and continuation (Adding grades to schools that do not offer the full range)

In some cases, limitations in installed capacity create problems for students who want to take or continue with certain studies, since some schools may only go up to second, third or fourth grade. However, as will be found in one of the cases that will be studied in detail further on, these limitations can be the result of the distribution of the supply or of the organization of courses by grades, which prevents one and the same teacher from teaching children in different grades.[42] Determining what the specific limitations (bottlenecks) are for teaching a larger number of students or for a longer time, could facilitate the solution of these problems.

m. Transportation for children living at a distance

In some cases, providing transportation can solve the problem of continuation for children living more than one hour on foot (3–4 km) away from otherwise suitable schools.[43] Handing out bicycles, for instance, either as gifts or on loan, with certain conditions as to maintenance, can be an effective means of facilitating access to or continuation in nuclear or central schools. A bicycle can increase a child's radius of action to 12–15 km in less than an hour. Provision of a bicycle must also be made conditional on school attendance requirements. In areas where public transportation is available, a subsidy for children from low-income families that live beyond the normal distances can bring schools in a 30-km radius within reach.[44]

n. Less frequent teacher rotation

As can be seen from Table VIII-1, some studies suggest that teacher rotation (transfer or change of post) can have disastrous effects on scholastic achievement.[45] This is a problem of the administration of the system, which organizes the period during which teachers can perform their functions. When a vacancy occurs during the course of a year, it should be possible to obtain substitutes who are not already employed, or, at least, to use as substitutes teachers who are not obliged to leave the classes they are already teaching to perform the substitute duties.[46] The fact that substitute teaching is not permanent can make teachers less inclined to leave other classes to take the new post.

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[41] Table VIII-1 refers to two studies by Schiefelbein-Farrell for Chile and that of Wolff for Brazil. See also Farrell, J., M. A. Sepulveda-Stuardo and S. Heyneman. *Textbooks and Achievement: What we know.* Education Department, World Bank, June 1978.

[42] It should be noted that a large part of the United States generation now in the process of retiring from the labor force was educated in primary schools with only one teacher. This does not appear to have limited its capability or drive.

[43] Studies in El Salvador and Uganda have produced unclear findings as to the effect of the distance at which children live from school. (See S. Heyneman, op. cit., pp. 41/42 and Table 2.) However, this could reflect the fact that those who live farthest away only go to school when they have the means of getting there, which means that they are from a better-off economic stratum.

[44] Hallack, Jacques. *The School Map, an instrument of education policy.* IIEP-UNESCO, Paris, 1978.

o. Duration and determination of school year and organization

In some cases, children do not make the progress they ought because they are taken out of school to help with the harvests. Rescheduling of vacations could, however, solve this type of problem. In other cases, when there is no pressure to stay home and help at particular times of the year, the schools could be used year-round and thus accommodate 50% more students than in a regular school year.[47] In some countries, the itinerant teacher system under which teachers accompany those who emigrate during the harvest time has shown positive results.[48] Scheduling of the school year in each locality by parents (and guardians) could be an excellent means of solving these problems.

p. Credit for work and experience

In higher grades, credit could be given for knowledge gained from work done. At least a part of school activities could be replaced by work that cannot be avoided, given the traditions and circumstances of the society concerned.

q. Health care

Some of the measures already noted specifically include health care because of the impact that it can have on attendance, attention and scholastic achievement in general. More effective disease prevention could be supplemented by promotion of breast-feeding of the new born during the early months of life.[49] This type of measure could be expanded to include a review of the fundamental needs of the population,[50] but this would be beyond the bounds of purely education policy.

r. Allowances and scholarships

In some cases, lack of scholastic achievement is connected with economic problems. In such instances, the only solution is to find employment for the parents or to directly subsidize the children. It should be noted that in many instances the opportunity cost (i.e., what the child could earn through getting a job instead of stay-ing at school) can be high, but the amount of the scholarship given could be somewhat lower, just enough so that, combined with the desire for education (or for what education would be worth in the future), it would motivate the children and their parents to see that they stay and work hard enough to achieve the required progress.

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[45] Wolff, Larry. *Why children fail in first grade in Rio Grande do Sul; implications for policy and reseerch.* Human Resources Office, USAID, Rio de Janeiro, 1970.

[46] Substitute teachers are not as good as regular teachers. See New York State Office of Education Performance Review. *Teacher Absenteeism in New York City and the cost effectiveness of substitute teachers.* State Department of Education, Albany, N.Y., January 1974.

[47] Schiefelbein, E. Elección racional entre alternativas educacionales y el sentido comun. *Educación Hoy.* Ano IV, No. 20, 1974, pp. 17-18.

[48] PREALC. Empleo y Recursos Humanos en Bolivia. No. 85, 1975, pp. 1-17.

[49] Andraca, A. M. and S. Magendzo. *Seguimiento y evaluación del Programa de Fomento de la lactancia materna.* PILIE, 1977.

[50] Germani, Celia. Tradición y cambio en la Educacion Preescolar Latinoamericana. *Educación Hoy.* Ano IV, No. 22, 1974.

Many other alternatives could also be considered for remedying the problem of scholastic failure. However, the solutions outlined above give an idea of the range of policy measures, both those that are strictly education-related and those related to other sectors of society, and of various mixes of them that are capable of contributing significantly toward lowering repetition and dropout rates. An idea of the magnitude of the financial implications of some of these measures can be obtained from the specific cases of Chile and Paraguay that will now be considered.

B. THE CASE OF CHILE

Table VIII-5 illustrates certain relatively marked trends in recent enrollment figures for basic education in Chile. With the exception of 1971, when there was a sharp increase—the result of the social climate at the time—first-grade enrollments have been tending to shrink. This decline has been more pronounced since 1975. Between the start and the end of the period covered by the table, overall first-grade enrollment has decreased by over 50,000.

As regards second grade, after a peak in 1972 the figures dropped back to the same levels as before; between 1972 and 1977 numbers fell by more than 60,000. In eighth grade, on the other hand, there was an increase of almost 100,000 between 1961 and 1977, although there has been a certain stagnation over the past five years.

1. Analysis of background data

It should be noted that, throughout the period 1960–1977, first-grade enrollment was about two-thirds greater than the 7-year-old population, which should, ideally, be the one served by this grade (Table VIII-5). This indicates that the highest repetition rates are in the early grades.[51] These high repetition rates mean that direct comparison of enrollment figures can lead to dubious conclusions, unless very great care is exercised.[52]

The figures by ages and grades given in Table VIII-6 show that about 100% of each age group (cohort) is being educated. If it is assumed that the entire 7-year age group enters school each year plus a certain number of 6-year olds (the proportion of which has been increasing over time from 4.6% to 5.9% in 1977), the number of "new" pupils each year can be determined. These figures make it possible, in turn, to estimate the repetition rates.[53] These estimates are presented in Table VIII-7, assuming that there are no dropouts (maximum repetition rate) or that only students 14 years of age and over drop out (minimum repetition rate), since Table VIII-6 indicates virtually 100% enrollment for ages 8 through 13, i.e., that dropping out does not occur until after age 13. Table VIII-6 also shows 1,000 children of 14 years of age and over in first grade (2,500 of 13 years and over), so that it can be estimated that the maximum number who can drop out of first grade would be 5,000, the limit fixed by the minimum repetition rate.[54]

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[51] Schiefelbein, E. La subestimación del problema de repetición en América Latina. CEE, Vol. VII, No. 2, 1977.

[52] If there has been a marked reduction in repeating, a larger number of "new" pupils could be coming in than before, and they would progress through the grades quicker and would therefore move into the higher grades in larger numbers than in previous periods.

[53] To the extent that a maximum number of "new" pupils is estimated, the number of repeaters tends to be reduced i.e.. repetition rates would in any event reflect a bias toward underestimating those ratios.

Table VIII-7 shows that there has been a significant reduction in repetition rates in recent years. Either this reduction is quite fortuitous—because no similar changes have been noted in other Latin American countries[55]—or the changes were brought about by the policies introduced in the mid-1960's.

2. Description of previous policies

Significant achievements under earlier policies were the following:

a. The partial neutralizing of unfavorable socio-economic factors through provision of school breakfasts and lunches, shoes, uniforms, textbooks and other materials. A special agency was set up to help students in these matters. By 1970, one out of every two schoolchildren, i.e., those from the lowest socio-economic groups, was receiving breakfast every day and one out of every four was also being given lunch.

b. Increase in the school system's ability to cope with individual differences through establishing new standards for promotion to the next grade that took such differences into account, training teachers, and designing new curricula that gave special attention to the integration of learning experiences and emphasized learning more than teaching.

c. Reduction of the problems caused by the wide age range in each grade through expansion of the system's physical capacity, and adoption of a system of promotion based on attendance. This made it possible to take a large proportion of 6-1/2 to 7-year olds into the first grade while making space in the higher grades for those promoted. This reduction in age disparities enabled teachers to organize their classes for more homogeneous groups and to use the curriculum suggestions to better advantage (these suggestions related after all to the "normal" ages for the particular grade). Small libraries of sixty books each were given to each primary school, and the principals were encouraged to seek additional assistance from the communities. Three weeks of remedial education were introduced for students who had learning problems in the previous year, so as to ensure that the system of promotion based on attendance did not involve a mere transfer of the learning problem to the next grade.

d. Encouragement of parent participation, both in the actual running of the schools and (in rural areas) in their construction. The virtual elimination of illiteracy, especially in the "young marrieds" age groups, together with public opinion campaigns to discuss education problems, strongly motivated parents to take an interest in their children's education. The establishment of the national televi-

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[54] This figure could be higher in some years (especially 1974) because of the exceptional circumstances then obtaining in Chile, but this would not change the trends for the period.

[55] Schiefelbein, E., and Maria Clara Grossi. *Estimating Educational Wastage in Developing Countries.*" UNESCO, 1979.

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sion system also brought many homes into contact with other life styles and values and had a profound cultural impact.[56]

All of these factors plus increased rural migration to the cities undoubtedly contributed to an initial lowering of the repetition rate in the first grade—from about 50% in 1964 to some 35% in 1970, which still could not be considered satisfactory. However, the interesting thing is that the rate continued to fall in subsequent years and is now 25% or less. This would suggest that both the public and educators have been made aware of the problem of repeating.

The elimination of automatic promotion in 1974 does not appear to have had any negative impact. It should also be noted that its institution in Venezuela did not produce the positive results expected. In other words, the mere introduction of certain standards is not enough to change attitudes and traditions. More far reaching changes are needed if teachers are to become aware that they are responsible for ensuring that normal children attain satisfactory levels of scholastic achievement, and parents, that it is their duty to see to it that their children go to schools when they should since the ability to read and write is normal in a literate population.

However, notwithstanding the progress made, one out of every four children who enter the school system is still repeating first grade.[57] The aim must nevertheless be to eliminate repeating (while of course continuing to provide special education for children with physical or mental handicaps).[58] This would probably entail adjusting the learning experiences to the specific characteristics of each child (a particular spelling book or reading method that is best suited to each child could be adopted).

3. Study of possible causes of the present repeating

The high repetition rates in basic education could arise from there being too many children in each class. However, in the public sector the average per class did not exceed 40 in 1974 in any region while in the private sector it was around 50 in the rural areas of the Ninth Region only.[59]

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[56] There is a positive correlation between access to TV and scholastic achievement in Chile (going by socio-economic indicators). Something similar is noted in Venezuela. In other countries, it has been found to be negative. See Hornik, Robert C. Television access and the slowing of cognitive growth. *American Educational Research Journal*, Winter 1978, Vol. 15, No. 1, pp. 1-15.

[57] According to the education authorities, 239,092 first grade students were promoted in 1974. This could indicate more extensive dropping out or, if there were fewer "new" pupils, that more than the 102,400 estimated in Table VIII-7 repeated (i.e., there were not so many "new" pupils).

[58] In recent years there has been more "grade level retardation" compared with 1970. The 1975 first grade is slightly down with respect to 1970, as could be deduced from the lower enrollment rate of 7-year-olds. This could be dangerous if the fact that the children are not entering the system when they should is a significant factor in repeating, since it could point to deterioration in the future. It is more difficult to explain the greater retardation in the fifth, ninth, tenth, eleventh and twelfth grades. The problem in the fifth grade is offset by the progress made in the eighth grade, i.e., the situation in basic or primary education is relatively stable. At the secondary level, on the other hand, there might have been more repeating because of the greater emphasis on good marks for promotion. The data from the "Tracer" project show extraordinary persistence on the part of the students in remaining in the secondary level despite repeating a grade several times (see Schiefelbein and Farrell. *Final Report Phase I. Tracer Study, Chile.* CIDE, June 1978.

The averages may mask intraregional disparities. Instances of more than 50 pupils per class number 3,553. However, there are 2,863 cases with fewer than 20 per class and 9,149 with between 21 and 30. This points up the need to improve the distribution of teaching posts; "hetergeneous" classes of 50 students ought certainly to be taught by two teachers.

Although available study data indicate that class size (within the ranges normal in the system) does not affect student achievement, general efficiency could possibly be improved by better distribution of the teacher's load.[60]

Organization appears to be better in the larger schools.[61] Table VIII-8 shows that the larger schools had average class sizes more in line with Chilean circumstances (except in the urban private schools) and, while no data are available, it is probable that distributions were grouped very closely around these averages. In future it would be advisable to look more closely into the operation of the smaller schools (those with fewer than 200 pupils) that show very low averages in the urban sector and very high ones in the rural sector. In any event, the averages for the rural areas ought to be lower than those for the urban areas in view of the greater difficulties teachers face there.

Another cause of repeating is that not all schools offer a full course. Many parents who are unable to send their children to other schools to complete their education prefer them to repeat the last grade given by the local school, because they are convinced they will at least learn a little more by so doing. The percentage of schools offering complete courses is shown in Table VIII-9. The low proportion of rural basic schools offering all the basic grades will be noted.

Most private schools appear to offer at least the third grade. In the public sector, at least the fourth grade is offered in rural areas and the fifth grade, in the urban areas. As a rule, the public schools offer more grades and are distributed more evenly throughout the country than are private schools.[62]

The impact on repeating of other factors such as length of the school year, provision of textbooks, and curriculum remains to be examined. The effect of the integrated curriculum on the first years of basic education needs to be studied. In theory, the present curriculum allows considerable flexibility for providing for children with different learning speeds or for concentrating on the subjects that are usually decisive for promotion, such as mathematics and Spanish. However, these suggestions are seemingly being applied (or administered) too rigidly and have in effect been converted into rules.

Some experiments made by the Centro de Perfeccionamiento (CPEIP) in schools serving low-income sectors of Santiago indicate that certain adjustments to the curriculum could have a significant impact on the system's efficiency.[63]

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[59] Schiefelbein, E. and J. Ramirez. Analisis de la matrícula del sistema educacional en el año 1974. In *Antecedentes para la planificación de los Recursos Humanos en Chile.* PREALC/118, July 1977.

[60] It should be noted that, while the metropolitan area has high student/teacher ratios, it has the best achievements in the country, which may be explained by the better cultural facilities of that area.

[61] Perhaps they have better teachers or more teaching resources.

[62] Schiefelbein, E. and J. Ramirez, Analísis de la matrícula del sistema educacional en el año 1974, op. cit.

The increase in prebasic education could be another factor that helps explain the lower repetition rates.[64] The following quotation from Filp and Latorre's study will serve to illustrate this point: "To obtain an initial indicator of the relationship between scholastic achievement and preschool education, promotion rates were related to the percentage of children who attended kindergartens (transition level, public schools run by the Ministry of Education (MINEDUC))[65] in each of the regions." Table VIII-10 (fourth column) gives the ratio between prebasic enrollment in public schools by region in 1975 and enrollment in the first year in public basic education in 1976. This ratio provides an estimate of the probability that a child in first grade in 1976 attended a kindergarten in 1975. The fifth column shows the percentage of promotion into the first basic year in 1976 and the last column the percentage of PEX (extreme poverty) preschool children by region (this percentage is calculated from the child population of each region). The correlation between the prebasic and first year basic enrollment ratio and the promotion rate is equal to 0.78 ($p < .05$). The correlation between the ratio and the repetition rate is $r = -0.69$ ($p < .05$). This suggests that, in the regions where children in the first year of basic education are more likely to have attended prebasic (kindergarten) education, the promotion rate is higher. However, the promotion rate might be connected with the level of economic development of the individual regions. In the regions where there are more poor children, the prebasic enrollment rate is probably lower. To check this out, the "prebasic enrollment/first year basic enrollment" ratio was correlated with the "estimated number of PEX children in each region." The correlation is not significant ($r = 0.46$, $p < .10$). These findings suggest that preschool education possibly favors better achievement in the first year of basic education. However, this evidence is only such as to warrant making "suggestions" and specific studies will have to be made to explore this relationship directly.[66]

In 1977, the Ministry of Education served 110,409 children over four years of age (81,639 in the public sector and 28,770 in the private) who were in the transition period while the National Kindergarten Board (JNJI) served 37,772 children of all ages until their entrance into basic education (of whom 11,805 were in the transition level). In general, 18% (93,444 children) of the 4 to 6 year age group and 9.6% of the 0 to 6 year group is served. This type of education has expanded rapidly (especially in the public sector) since the enactment of Law 17,301 establishing the JNJI. Here we must also consider the children who are receiving more attention from their parents because of the parent training programs.[67]

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[63] Castillo, Gabriel, *et al. Proyecto Escuela para Aprender, Primer Informe.* CPEIP, Lo Barnechea, 1975. See also *Educación* Hoy, Ano V, No. 30, 1975.

[64] There is a study that seems to suggest this (Bravo, Luis. *Estudio de Deserción y Repitencia Escolar.* Programa de Educación Especial, Universidad Católica, 1978). For another research study on this relationship, see Filp, J., E. Schiefelbein and N. McGinn. *Relaciones entre enseñanza pre-básica y básica.* CIDE, Santiago, 1978.

[65] The prebasic enrollment in MINEDUC public schools in 1975 included the bulk of all children enrolled in the transition level, i.e., that immediately preceding the first grade of primary school.

[66] The school population of 0 to 5 years from the extreme poverty sector is taken at 393,326. Figure quoted in Filp, J. and C. L. Latorre. *Antecedentes sobre la Educación Preescolar en Chile.* CIDE, 1978.

Kindergarten programs are concentrated in the urban sector. Of the total number of preschool children served by Ministry of Education kindergartens, only 4,500 or 3% are in the rural sector (the Ministry is the only institution providing kindergarten facilities in rural areas). Of the total of 148,181 children, 35% (31,839 in Ministry kindergartens and 20,245 in JNJI facilities) are from the extreme poverty sector and are served almost exclusively by the public sector.[68]

The follow-up of a cohort of students who were in eighth grade in 1970, to 1974 when they completed their secondary studies makes it possible to determine how the type of family (and its socio-economic level) influences their continuation in the education system. The study also considered other points such as the father's occupation, availability of goods, and characteristics of the home, and all were found to exercise similar effects:

- Practically 100% of the students who were children of fathers with university education completed their secondary schooling.
- 72% of the children of fathers with secondary education completed basic education, but then had trouble making it through secondary school, which only 32% of them completed.
- The children of fathers with primary education dropped out a constant rate during the twelve years of schooling; 43% completed basic and 12%, secondary education.
- Practically no students (only 3%) whose fathers were illiterates completed their secondary studies and not more than 10% got as far as the eighth grade of basic education.

4. Strategy for tackling the problem

The background data on the case of Chile make it possible to reduce the range of alternative solutions and to define more accurately the types of population on which efforts ought to be concentrated.[69]

The data noted above make it clear that there is no point in worrying about students from families at the upper socio-economic levels. These children can be expected to remain in the system almost up to the university level. Children of illiterate peasants, on the other hand, have a low probability of scholastic survival.

Various levels of poverty can be noted in each area (see Table VIII-11). Two studies are helpful in this connection: the "Map of Extreme Poverty", prepared by ODEPLAN from 1970 census data, and the "National School Meals Program Survey", carried out by the Ministry of the Interior in 1976. The first study used population and housing data to determine orders of magnitude of the resource availability (poverty) of the population in each of the age groups.

The National School Meals Program Survey made by the Ministry of the Interior in 1976[70] distinguishes between five strata in the population attending basic education, viz.:

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[67] Whelan *et al.* Un programa de educación familiar y comunitaria para el desarrollo del niño rural en Chile. *Educacion Hoy.* Ano VII, No. 42, 1977.

[68] Filp and Latorre, *op. cit.*

[69] Carmen Luz Latorre assisted with this work and made the estimates described later.

a. Students from population in extreme poverty (PEX)

These students are from households characterized by: (i) living in housing of the hut, cabin or shanty type, or made from scrap materials or old railway cars, and lacking any sanitary sewerage system; (ii) living in overcrowded conditions with an average of more than four persons per room; and (iii) having a monthly income of less than the minimum wage, which in November 1976 meant an average of less than CH$80 *per capita.*

b. Students whose parents work in the Minimum Employment Program (PEM)

Students whose father or mother or the person acting as head of the household is registered (1976) with the Minimum Employment Program and accordingly receives the relevant subsidy (CH$80).

c. Students from low-income household (DER)

Students from households characterized by: (i) living in a dwelling similar to those described for the PEX group and with the same level of overcrowding, and (ii) having a total monthly income equivalent to the minimum wage plus the pertinent family allowances, i.e., a *per capita* average of between CH$80 and CH$140/month (as of November 1976).

d. Students from households with income adequate for essentials (RIN)

Students from households characterized by: (i) living in a dwelling meeting minimum comfort and sanitary standards, such as a CORVI house, of a semipermanent or, generally, permanent nature, with light, water, and sewerage or septic tank; (ii) not overcrowded, with two or more bedrooms with not more than three persons per room on average; (iii) having a monthly income in excess of the minimum wage plus family allowances and sufficient to cover, as a minimum, such essentials as food, clothing, health and education, i.e., averaging between CH$140 and CH$200 per month (as of November 1976).

e. Students from households without problems (SP)

Students from households whose socio-economic position is better than that of the preceding group and which are, therefore, able to afford more than the minimum necessities (housing, adequate diet, health, education and other basics).

These groups, as defined above, can be easily tied in with the designations more commonly used for social strata (lower, lower-middle, upper-middle and upper). "Lower" would comprise three groups, PEX, PEM and low-income; the RIN group would match "lower-middle," and "without problems" would include the middle, upper-middle and upper classes. The data already considered regarding levels of schooling show that a further breakdown of this last-mentioned group is not necessary.

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[70] The Ministry of the Interior of the Republic of Chile carried out the National School Meals Program Survey between 8 and 19 November 1976. The survey was designed to measure and relate two variables: socio-economic status of the students and the welfare services they received. Three indicators were used to define the socio-economic status of the student's family: housing conditions, overcrowding, and income level.

Differences between the definitions used in the two studies used in the comparison were not detected, despite a careful examination of the data available; it might be, for instance, that, while the definitions given for the PEX, PEM and DER groups in the Ministry of the Interior survey relate to unquestionably poor groups, the Map of Extreme Poverty only included the poverty categories (PEX and PEM) and not the DER students.

For further refinement of the analysis it would be necessary to make separate studies of three cultural subgroups in the country: the Mapuche in south-central Chile, the Aymara in the north Andean area, and the Easter Islanders.

The careful definition of groups at this level of disaggregation makes it possible to relate specific education policy measures with desirable or probable results (depending on the amount of knowledge obtained from previous studies) and thus to estimate the cost-effectiveness of each type of measure and to calculate the funds that would be needed in each case.

5. Alternative solutions and cost of programs

Here we shall examine for Chile the set of measures mentioned earlier in section A-4 that would involve preprimary education as well as other measures that would entail changes in the education customarily provided by primary schools.[71] Specifically, the measures described under A-4-f, e, i, o, n, h, l, m, k and b of section A-4 will be examined. Another alternative, not previously mentioned, would be to increase the number of pupils per teacher. If the proposed measures have an excessive impact on the budget available (or acceptable given the country's general policies), the number of pupils per teacher may be increased to 40 or 45 without this having any negative effect on scholastic achievement (given the method of education being used), as noted in section A.

The cost of the programs described under A-4-i, o, n, and h is not sufficient to warrant a detailed study. The cost of the other programs is examined below.

a. Television programs

Television rights for transmission in Chile of "Sesame Street" (Mexican version) would have been US$70,000 for the 260 chapters available in 1975. Each chapter runs for 30–45 minutes and could be repeated as many as four times. Each half hour of transmission costs US$400 (outside prime time), so that US$130,000 per year would have had to be added if most of the country were to be reached. The cost of the "Electric Company" series for older children would have been about the same.

b. Training of parents

The cost of training parents to teach their children is about US$50 per year per couple,[72] i.e., less than that of kindergartens even after deducting the cost of meals provided in them.[73] Another advantage of these programs is that they can be carried out in rural areas where other systems are more difficult to put into effect. Since there are 600,000 children aged 0-5 years in the poor group (see Table VIII-11), which could be taken as the equivalent of 400,000 families, it is proposed that this group be provided for over a four-year period at a cost of US$5 million per year.

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[71] While no precise data are to hand from studies to estimate the effects of changing the combinations of resources, various indications are provided by certain studies that have been made. This aspect is examined in greater detail by Schiefelbein, E. and J. Farrell. Expandiendo el campo de la planificación educacional. *Tecnología Educativa,* No. 3, Vol. 3, 1977.

c. *Completing schools that do not offer all grades*

About 500 schools only go up to fourth grade; another 500 up to fifth grade; 2,800 up to sixth grade; and 400 up to seventh grade (see Table VIII-12). They could be gradually converted into full-course schools at a rate of about 500 a year, beginning with those currently offering the fewest grades, most of which are in rural areas. Sufficient data are not available to identify those that would only need additional teachers and those that would also need more classrooms, so the cost of this program has been overestimated.[74] The annual cost of each teacher is estimated at US$2,400[75] and the construction cost per square meter of school buildings is around US$150 or US$7,500[76] for a 50 m^2 classroom so that a total of US$10,000 would be required to operate one classroom. The maximum capital cost for 500 classrooms (one in each school) would be around US$1 million per year.

d. *Providing transportation*

No data are available on home-to-nearest-school distances. As there are large areas of Chile where rainfall is low and roads are usable most of the year, experiments could be tried with loaning bicycles to children over fourth grade (not to younger ones so as to avoid problems with small children having accidents) who live more than four or five kilometers away. A program to distribute 20,000 bicycles at an average cost of US$25 each would cost US$500,000, i.e., a relatively small sum.

e. *Distribution of textbooks*

Considerable savings are possible by purchasing textbooks in bulk. Prices can be brought down to around US$1 for a 100-page book if the order is for more than 100,000 copies (the cost of a paperback is similar although it has more pages). For the two subjects considered, and adding a work book for each, the cost of supply-ing 2 million pupils in basic education (this program would not be extended to private fee-paying schools) would be US$8 million. As a textbook has a useful life of three years but workbooks can be used only once, an average useful life of two years can be assumed, which makes the annual cost US$4 million.

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[72] In experimental programs, US$64 per household has been spent for training given over 14 months during which 48 meetings were held and 12 units examined (each unit required four sessions on average). However, the cost of training the instructors—a major item—can be reduced by employing them over a longer period. The situation is similar as regards materials; accordingly, the cost is reduced to US$50 per household.

[73] Creches (from 84 days to 24 months) cost US$600/year; for children 2-4 years the cost is US$300, and somewhat less for 4-6 year olds. In each case the cost of food is about US$100/year.

[74] This aspect is studied in detail in the case of Paraguay.

[75] A newly appointed primary teacher is paid US$120-150 a month (depending on when the salary is adjusted). He receives a bonus every three years (10% in each year and 20% in the first). An average monthly salary of US$200 was therefore assumed, or US$2,400/year.

[76] The use of standardized procedures and prefabricated components would make it possible to reduce the cost by some 40% for a large-scale building program of the type this type of measure would entail.

f. Student/teacher ratio

The average number of students per teacher in 1974 was 36, down from 37 in 1970. This means that increases of 4 (to make 40) or of 9 (to make classes of 45) would make it possible to increase enrollments by 11% and 25% respectively without additional cost to the system.[77] In the first case (11% increase) this would represent a saving equivalent to 240,000 students at an annual cost per student of US$80, i.e., a reduction of US$19,200,000 per annum. This saving is much larger than the total annual cost of all the programs described in the preceding paragraphs.

6. Financial Impact

The total annual cost of the various programs proposed above is US$14,450,000 i.e., less than the savings that would be obtained from a small (11%) increase in class size (student-teacher ratio). It would amount to less than 2 per mil of the gross national product (GNP).

In any event, this increase would only represent 2.7% of total public expenditure on education and would fall to 2.2% in terms of the total national expenditure on education,[78] i.e., including the private sector. These percentages are relatively small in comparison with the annual fluctuations in expenditure on education and consequently would not be difficult to absorb, although this does not take into account the reassignment of teachers suggested at the end of the previous section.

However, there is a second source of pressure that is sometimes overlooked in considering these problems: the pressure deriving from the longer time students stay in the school system. To take this into consideration, the projections resulting from not changing the promotion rates must be compared with the modified estimates. These estimates are hard to arrive at because the relationships between the measures adopted and their effects are not precisely known. We accordingly prefer to consider this aspect in greater detail in the case of Paraguay, using the data for the change in repetition rates brought about in Chile, after 1966, as shown in Table VIII-7.

C. THE CASE OF PARAGUAY

1. Background

Table VIII-13 shows constant growth of the enrollment in the primary level of the Paraguayan system. The total number of pupils in this level rose from 344,637 in 1964 to 467,552 in 1976. However, the increase is accounted for basically by the higher grades, since the first grade figures remain virtually unchanged. As was done for Chile, certain additional background data will be studied to ascertain the development of the system's efficiency (mainly through the promotion rates) and the way in which ratios have varied.

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[77] The ratio can be increased gradually as and when new classrooms are built under normal plans for expansion or replacement (between 10 and 15% a year).

[78] Latorre, Carmen Luz. *La asignación de recursos a educación en los ultimos años.* Mimeographed, CPU, June 1978, Table 1.

Table VIII-14 shows the enrollment ratios for the past ten years. While the population figures may not be entirely error-free and thus generate distortions in the ratios, a considerable increase is evident between 1965 and 1970; it holds up to 1972 then drops back, in 1975, to give a level very similar to that of 1965. The constant nature of these ratios would appear to indicate that part of the increase in enrollment derives from providing for the natural increase in population, but at the same time (as the first grade remains constant while the later grades expand) some degree of improvement has seemingly been achieved in the repetition rates in the early grades.

As the highest enrollment ratios are found at nine or ten years of age, and are around 90% at present, an estimate can be made of the "new" students entering each year in order to obtain some idea of the change in the repetition rates. It is assumed that 95% of each group of 7-year-olds enter the system at some time. The results are shown in Table VIII-15.

A gradual reduction in repetition rates is apparent over the period analyzed. From over 50% in 1964 it is less than 40% now. It should be noted that the problem was not fully recognized because the official figures (obtained from data reported by the schools) do not show it. The repetition rates calculated from the school figures seriously underestimate the magnitude of the problem (as may be seen by comparing the last two columns in Table VIII-15) and do not accurately reflect its trends.[79]

In other words, while the stagnation in first grade enrollment results to some extent from the differing levels of provision made for the various age groups (as may be seen from Table VIII-14), it is basically due to the reduction in the repetition rates in this grade.

2. Analysis of factors that might affect repetition rates in Paraguay

The high level of repetition observed in the second and subsequent grades could be connected with the top grade offered by the schools. Table VIII-16 presents some relevant data.

Nineteen percent of the rural schools do not go beyond second grade and 35% offer education only up to fourth grade.[80] This can be an important factor in repetition, since there are 273,830 children in the rural areas, and once many of them have completed their local school, they are not able to move away from home to a more distant school, so they simply have to repeat if they want to stay on in school in the hope of learning something more. Continuation is not, for all practical purposes, a problem in urban areas, and even in cases where a school does not offer the full number of grades, it is highly probable that students will be able to find another one nearby where they can continue their studies.

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[79] Detailed estimates for each of the primary school grades show repetition rates of around 40% in the second grade in 1972-1974 after which they fall to 35%. In the third grade they fluctuate around 30% and in the fourth grade around 25%. See *Características del Flujo de Matrícula Escolar en la Educación Primaria del Paraguay*. Serie Estudios No. 3, Ministerio de Educación y Culto, Asunción, November 1977.

[80] In the 1972 census, 18.3% of parents stated that their children did not go to school because there was not one nearby.

Class size—although it does not appear to have much impact on achievement, to go by the findings of studies commented on in A-1—is nevertheless worth looking into in connection with these problems. The findings are presented in Table VIII-17.

Only 10% of the classes have more than 40 students. In fact, Table VIII-12 shows that the classes are quite small, over 60% of them having fewer than 30 students, a situation that would be hard to find anywhere else in Latin America. The average is 29 students per teacher. A recent study shows that, if the average class size were raised to 40, it would be possible to provide for a further 36,040 children without extra cost, i.e., 50% of those not enrolled in 1972 could be taken care of.[81]

The size of the classes is determined in part by the relatively scattered distribution of Paraguayan schools. Classes of fewer than 25 students tend to predominate in schools with 150 or fewer students in the urban areas and among those with fewer than 70 in the rural areas. However, the total number of urban schools with small classes is, in general, very small (some 140 altogether in the entire country); in other words, the largest number of small classes is in fact found in rural schools (some 900 classes in all).

The small classes are found in single-shift schools, perhaps because there is no great demand for places in the school system (lack of students). However, this may itself be due to the fact that higher grades (multigrade classes) are not offered. In other words, if the aim is to serve a larger number of students, those who have already left the system because they have gone through all the grades offered by their local schools, would have to be encouraged to seek further education. This question will be examined separately in the next section but, before doing so, we should look at another factor behind low achievement, i.e., teacher rotation. The data are given in Table VIII-18.

In 40% of the schools, at least one teacher moves or is moved during the year. Contrary to what happens in other countries, this rotation is greater in the urban (60%) than in the rural areas (33%). This indicator, however, is not adequate, since it only distinguishes between schools where some staff move and those where this does not happen. This is why the complete (and larger) schools are the ones shown as having the highest teacher rotation.

It should be noted, finally, that the Ministry has centered its efforts on completing the schools by providing multigrade classes. It could be that this has helped reduce attrition in the higher grades. Later on we shall explore the possibility of expanding these policies and determining where they could have the greatest impact.

3. Definition of the problem of incomplete schools

Many of the measures examined in the case of Chile could also be envisaged for Paraguay. However, the availability of a sample of the statistics sheets furnished by the schools enabled us to make a detailed analysis in this case of the schools' situation as regards number of shifts, teacher availability and multigrade classes offered. Our comments will therefore focus on this topic, which is of general importance through Latin America.[82]

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[81] Ministry of Education and Worship, Series of studies on the financing of Paraguay's education system, No. 6, Asuncion, June 1978.

The proportion of multigrade classes has declined slightly (from 41% in 1974 to 40% in 1976), although the percentage of complete schools in rural areas has remained unchanged.[83]

The fact that more than half of the incomplete schools have multigrade classes (58% in 1974 and 54% in 1976) indicates that the Ministry has implemented its policy; however, this progress by itself has not been sufficient to provide complete schooling. It could be an indication of shortage of students, lack of premises, or lack of teachers (the data examined are not in themselves sufficient to suggest decisions). A similar analysis could be made for the few (1%) incomplete urban schools identified in the sample. In view of the interest in the rural areas, as already mentioned, this analysis will focus on the rural schools.

To study the first aspect of this problem it was decided to ascertain the relationship between multigrade classes and school size. The findings are presented in Table VIII-19. Generally speaking, all schools with more than 150 students are complete. The smaller the schools, the greater the proportion of incomplete ones, including schools that only go up to second grade. It will be noted that multigrade classes are related to a higher proportion of complete schools within each size group. In any event, Table VIII-19 suggests that there is a large number of schools with between 71 and 150 students where better distribution of the multigrade classes would make it possible to provide complete schooling and, hence, to serve children who have left because they have completed the grades offered. To sum up, there are schools where the multigrade system could continue to be implemented without the small number of students being an obstacle.

The lack of premises or teachers can be examined by means of the "number of shifts" variable. The findings are presented in Table VIII-20, for the rural sector only.

About 13% of the schools work one shift only (some 260 schools throughout the country). These schools have the installed (physical) capacity available to work a second shift. All that would be needed would be the funds to pay the teacher for the second shift; they already have a teacher who could take this second shift, but for the moment he only works in the morning.[84]

Half of the incomplete schools that work two shifts do not have multigrade classes. This suggests that many of them would be able to offer complete schooling if the teachers were given appropriate training or supervision.

It is worth while examining the relationships between shifts and school size for incomplete schools in the rural sector with a view to pinpointing the priority needs. In Table VIII-21 the sample data are expanded to the universe in order to estimate the number of schools in each situation.

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[82] Further details on this approach can be found in McGinn, Noel and E. Schiefelbein. *Use of Educational Statistics for Policy Analysis.* Mimeographed, Harvard University, CSED, Harvard University, June 1978.

[83] This percentage was 35% for the entire country in both 1974 and 1976, but dipped slightly in 1975, although this might be explained by the accuracy of the sample. The multigrade classes may have helped provide complete schooling in the urban areas. In any event, they declined in the period, notwithstanding the fact that the proportion of complete schools in the national total rose slightly to 23% in 1976.

[84] This involves supervision to ensure that the two full shifts of classes are actually given. In any event, candidates for teacher posts can always be obtained, although possibly with lower qualifications.

Almost all the schools with 71 and more students work two shifts. It should be noted that in this category there are some schools (without multigrade classes) that do not go beyond second grade. These would probably be given priority in future building programs (20 cases), together with those that do not have multigrade classes and do not go beyond fourth grade (240 cases). In both instances the higher classes might have to be multigrade.

There are 70 schools without multigrade classes that work one shift only and have few pupils. If they were to offer complete schooling, they might be able to attract a certain number of students for higher grades, which would enable them to organize one more multigrade class. These schools have top priority in the assignment of new teachers since, except where local surveys reveal that there is absolutely no demand, the skills acquired by students in getting through the lower grades may easily be lost through no use being made of them.

There are 210 schools which, although they have multigrade classes and work in a single shift, do not offer complete schooling. These could do so even if there were no additional demand in the community. In this case it is not more funds that are needed, but more supervision and training for the teachers to enable them to teach the third through sixth grade in one class, in 140 cases, and the fifth and sixth in 70 cases.

If there should still be funds left over, particularly for building, the schools with fewer than 70 pupils that currently work two shifts would be good candidates for having a second classroom built on.

Table VIII-22 shows the distribution of the schools studied according to average class size. This will make it easier to estimate the cost of expanding the supply of the various schools. Unfortunately, it was not possible to cross these two tables, which would have provided these cost estimates.

As may be seen, following an examination of the historical trend of the way in which the variables have been related, an effort has been made to present them in a manner that shows rather clearly where decisions can be made that will help to raise the system's efficiency or to bring about the greatest reduction in scholastic failures, in accordance with the present distribution of the existing resources (which are considered fixed costs, i.e., their opportunity cost is near zero).

In actual fact, the detailed study of the suggestions made in the above analysis complete the earlier review of the data available. Each school might have special features that would warrant some adjustments to the general priorities described above. Once the adjustments called for are known, they can be taken into account in the general analysis.

4. Cost of the program

Most of the programs for reducing scholastic failure examined in the case of Chile are not very costly; the same can be said of Paraguay. It also holds true for the cost of transmitting television programs such as Sesame Street. The other programs that have special characteristics in this case are examined below in detail:

a. Cost of training parents to teach their children before they enter primary school. It is difficult to estimate the number of children that would be involved, since population studies broken down by the relevant poverty levels are not available. Assuming that 30% of the lower-income population has to be covered, some 150,000 children aged 0 to 5 years would be involved, i.e., 100,000 families (at US$50 per family), or an annual cost of US$1,250,000 for four years would have to be covered.

b. Completing schools that do not offer all grades. A breakdown of the cost of completing all rural schools of this type is given in Table VIII-23. If the program is implemented over four years, the annual cost would be around US$1,500,000. It should be noted that the availability of more specific data has made it possible to reduce the total number of classrooms to be built and new teachers to be hired to a minimum.

c. Provision of textbooks in primary schools. Taking the same assumptions as for Chile, i.e., US$2/year/student to provide one textbook and a workbook, both for Spanish and mathematics, the program would cost US$800,000/year.

d. Increasing the number of students per teacher. A study by regions indicates that the school system could accommodate a further 36,000 children if the average number of students per class were raised to 40.[85] This would allow redistribution of teachers and reduction of the cost of creating the new teacher positions estimated in Table VIII-23.

5. Financial Impact

The annual cost of the various programs proposed for Paraguay amounts to US$3,950,000, i.e., approximately equivalent to the savings that could be derived from increasing the student/teacher ratio, which does not appear to affect the scholastic achievement of students, while the proposed programs would keep more students in the school system and ensure that those who pass through it receive the benefit of working their way through a larger number of grades.

In any event, this increase would be only 12% of the annual budget of the Ministry of Education and Worship, which in 1977 was US$32 million[86] or the equivalent to 2 per mil of Paraguay's GNP.

This suggests that it might be necessary to draw up a less ambitious program if the cost cannot be offset by the redistribution of teachers mentioned above.

Table VIII-24 presents enrollment estimates for Paraguay if promotion rates in primary schools remain constant, while Table VIII-25 estimates the probable change in these rates if the proposed programs were implemented. A comparison of the results shows that the first-grade enrollment declines[87] since the children are promoted to the higher grades more quickly, while there is a considerable increase in the number of students in the higher grades. All in all, the primary enrollment would rise from 640,700 to 691,200, that is, by 50,500 students.

The larger number of students retained in the system as a result of the proposed measures would entail a greater cost because of the higher enrollments.

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[85] *Caracteristicas del sistema de educaión primaria y sugerencias de alternativas para incrementar su eficiencia.* Ministry of Education and Worship, Directorate of Planning, Asuncion, April 1978.

[86] 1977 Yearbook, Statistics Unit, Directorate of Educational Planning, Ministry of Education and Worship, *Desarrollo Educativo en Cifras* series, Asuncion, 1978.

[87] The same type of phenomenon was examined under B-1 in the case of Chile. The reasons for it were also given there.

After ten years these measures would bring an increase of 50,000 students, which would mean a cost of approximately US$3 million at present class sizes or some US$2,250,000 if the policy of 40 students per class were to be implemented.[88] In other words, the annual increase would be about US$300,000, which requires a 1% annual increase in the budget.

The larger number of students graduating from the primary level could mean that more facilities and teachers would be needed in the secondary level. Should these be provided, the financial impact on the subsequent levels would clearly have to be considered.

D. CONCLUSIONS

No data are available on controlled experiments that show the precise effects of different measures on repetition or attrition in basic education. Nevertheless, investigations on given aspects or based on "cross section" data suggest that many such measures involve a change in the organization of the resources assigned to the schools rather than large additional investments.

In effect, in the case of Paraguay as in that of Chile, the set of measures that could probably substantially eliminate the problems identified involve expenditure of less than or close to two per mil of the GNP of each country.[89] On the other hand, the financial impact of these measures on the public expenditure on education is different since it depends on the proportion of the GNP that this sector receives. Therefore, while the total expenditure proposed for solving the problems of repetition would amount to 2.7% in Chile, this figure would be 12% in the case of Paraguay. In any case, this impact can be considerably reduced if simultaneously with the repeating-reducing programs the number of students per teacher is increased by 10%, a measure that would seem to have no significant negative effects on scholastic achievement.

The feasibility of reducing the problems of repetition has a great social impact, since the children who come from families at the lowest social levels are precisely those that are most affected by failure in the school system. Therefore, this strategy constitutes an effective way of reaching the most disadvantaged groups in society and offers them a way of surpassing their traditional levels of education.

Nevertheless, it should be borne in mind that the proposed measure may have a relatively long-term maturation period, twelve years as in the case of Chile (1965–1977) without the process being complete. That is to say, not only the attitudes of teachers, but also those of the authorities and heads of families must be changed if the full effect on the progress of students is to be achieved. Like any social change, it is first necessary to overcome the inertia that has thus far affected the failure of students, and has prevented the establishment of a tradition of success for the great majority of students.

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[88] Although there are considerable differences between types of schools (see *Investigación sobre costo de la Educación Primaria y Media, 1975,* Ministry of Education, AID, CEPADES, Asuncion, December 1976), the cost per student of rural primary schools outside Asuncion was G7,380 in 1975 (see Winkler, D. *Costo, financiamientos y resultados de la educación en el Paraguay.* University of California, September 1977), i.e., US$60.

[89] In addition to this expenditure, the increases entailed by normal population growth, salary increases, and other components of the unit costs per student must be considered.

The first step in attacking these problems is to recognize the true magnitude of school failure and its immediate causes. In Latin America, this has been concealed by its underestimation due to the way in which information on school failure has been gathered. The next step is to pinpoint the measures the school system itself can take to overcome it. That is to say, the myth that many of the problems of school failure are outside the school must be eliminated. There is no doubt that problems exist outside the school, but this should not be an excuse for the school not to play its appropriate role.

Finally, a proper system of reporting should be installed so as to monitor the progress made in eliminating the problems identified. The solutions should have a dynamic element that would gradually permit them to be adapted to a constantly changing world. If some type of correction is not periodically or continuously put into effect, problems as serious as those initially identified in this study will again appear.

Because of the complexity of these problems, advances must be made on several fronts simultaneously. One or two isolated measures are not enough; both the supply aspects of the system (installed capacity, teachers, texts, and other similar items) and the problems of demand, that is, the mobilization of parent and student interest in the acquisition of more and better education, must be tackled, and in this regard mass communication media should play a major role.

Although they do not require a large amount of funds, the measures proposed call for staunch political resolve or support. Major changes in a society cannot be attempted without such support, for whichever group is affected will press for a return to the *status quo.*

STATISTICAL APPENDIX

Table VIII-1. Latin America: Findings of Studies on Production Function in Education

Variables analyzed	Expected sign of the relationship	Statistically significant and with sign expected	Not statistically significant, or with opposite sign
Teacher variables			
1. Teacher qualifications (education)	+	Rivarola (4th and 6th grades) Echart et al. (secondary) Costa (R & M) Purves (II-Lit) Klees (74) Comber (IV-Sc.)	Morales (4th, 6th, 12th grades) Rivarola (secondary) Echart et al. (4th and 6th) Wolff. (70) Muñoz (71) Schiefelbein-Farrell (70) Purves (IV-Lit) Carroll (IV-French)
2. Teacher experience	+	Swett (6th grade) Rivarola (4th and 6th grades) Costa (M)	Morales (4th, 6th, 12th grades) Swett (1st and 4th grades) Rivarola (secondary) Echart et al. (all) Klees (74) Carroll (IV-French) Costa (L)
3. Teacher rotation	–	Wolff (70)	
4. Specialized training	+		Echart et al. (all) Schiefelbein-Farrell (70)
5. Maintains discipline	+	Rivarola (6th grade) Swett (6th grade)	Rivarola (4th grade) Swett (1st and 4th grades)
6. Innovative in teaching methods	+		Schief. et al. (69)
7. Education of teacher's father	+		Schief.-Farrell (78)
School variables			
1. Average class size (student/teacher ratio)	–	Swett (4th and 6th grades)	Morales (4th, 6th, 12th grades) Swett (1st grade) Schief.-Farrell (69) Schief. et al. (72) Echart et al. (all) Schief.-Farrell (70)
2. Equipment availability	+	Echart et al. (6th grade) Muñoz (71)	Echart et al. (4th grade and secondary)
3. Duration of school year	+	Schief. and Clavel (72–74)	
4. Two shifts (one group in morning and another in afternoon)	–		Jimenez DIE Schief.-Farrell (70)
5. Coeducational	+		Schief. and Clavel (72–74) Schief. and Farrell (70)
6. Out-of-school activities	+	Muñoz (71)	
7. Homework	+	Costa (M) Comber and Keeves (IV)	Comber and Keeves (I and II)
8. Textbooks available	+	Schief. et al. (72) Wolff (70) Schief. and Farrell (70)	
9. Expenditures per student	+	Swett (1st, 4th, 6th) Morales (4th, 6th, 12thS)	Swett (1st, 4th and 6th) Morales (12thL)
10. Use of library	+		Costa (L & M)
Student factors			
1. Reading matter available in home	+	Schief. and Farrell (70) Schief. and Farrell (78)	
2. Kindergarten	+	Wolff (70)	

Table VIII-1. Latin America: Findings of Studies on Production Function in Education (continued)

Variables analyzed	Expected sign of the relationship	Statistically significant and with sign expected	Not statistically significant, or with opposite sign
3. TV	+	Costa (R & M) Schief. and Farrell (70) Schief. and Clavel (72–74) Castaneda et al.	
4. Socio-economic level	+	Costa (R & M) Swett (4th and 8th) Schief. and Farrell (69–70)	Swett (1st, 4th and 6th)* Morales (4th, 6th, 12th grades)* Schief. and Clavel (72–74) Schief. and Farrell (78)
5. Family size	–	Costa (L) Morales (4thS, 6thS)	Costa (M) Schief. and Clavel (72–74) Morales (4thL, 6thL, L & M)
6. Repetition	–	Costa (L & M)	
7. Educational aspirations	+	Costa (M) Diaz-Guerrero	Costa (L)
8. Malnutrition	–	Schief. and Farrell (70) Morales (4th L and S) Schief. and Farrell (78)	Morales (4thL and S, 6th, 12th)
9. Self-concept	+	Diaz-Guerrero	
10. Intelligence (Raven)	+	Diaz-Guerrero	

Table VIII-2. Chile: Beta Coefficient of the Regressions of Education Level (in Years) in Each Age as a Function of Eight Independent Variables

Period in which sample obtained	Yr.		R^2	Quarterly income of household head	Education of household head	No. of rooms in home	Size of family group	Expenditure on food	Sex of child	TV in house	House services index	No. of cases
1	8	*	.20	+0.39*	−0.25	+0.12	−0.11	+0.13	+0.03	+0.02	+0.02	78
1	9	**	.28	−0.09	−0.14	+0.06	−0.03	+0.13	−0.14	+0.26	+0.36*	68
2	9	**	.31	+0.15	+0.15	−0.03	+0.04	−0.06	+0.11	+0.39**	0	74
4	9	*	.24	−0.22	+0.42*	+0.15	−0.04	+0.17	−0.21	+0.08	−0.05	79
1	10	**	.32	−0.08	+0.05	+0.09	−0.26*	+0.24	+0.21	+0.19	+0.05	64
2	10	**	.34	−0.14	+0.33*	−0.08	−0.07	0	−0.16	+0.14	+0.32*	73
3	10	**	.29	0	+0.02	+0.32**	−0.29**	−0.08	+0.12	+0.23	−0.20	100
1	11	**	.37	+0.28*	+0.04	+0.17	−0.22*	−0.07	+0.10	+0.07	+0.17	77
2	11	**	.29	0	+0.35*	+0.15	−0.13	+0.14	−0.04	−0.13	+0.10	77
4	11	**	.33	−0.17	+0.31*	+0.10	−0.19	−0.04	+0.05	−0.02	+0.40	79
1	12	**	.36	+0.10	0	+0.16	−0.21	−0.25	0	+0.36*	+0.17	65
1	13	*	.32	+0.25	+0.14	+0.24	−0.12	−0.43*	+0.06	+0.12	+0.20	50
2	13	**	.32	−0.03	−0.27	+0.38*	−0.06	−0.05	+0.07	+0.06	−0.06	62
4	13	*	.32	+0.04	0	+0.07	−0.35**	+0.21	−0.02	+0.11	+0.28	63
1	14	**	.32	0	+0.20	+0.15	−0.32*	+0.08	+0.04	−0.16	−0.20	60
2	14	**	.31	−0.18	+0.46*	+0.16	−0.26*	−0.15	+0.01	+0.13	−0.05	60
4	14	**	.43	+0.35*	+0.06	+0.12	−0.03	+0.09	−0.06	+0.20	−0.05	68
1	15	*	.36	+0.08	−0.14	+0.14	−0.21	−0.05	−0.25	+0.41*	+0.10	43
2	15	**	.42	+0.07	+0.21	+0.08	−0.06	+0.02	+0.15	+0.35*	−0.01	55
1	16	**	.43	+0.21	+0.49**	−0.03	−0.03	+0.09	+0.07	−0.07	+0.01	50
4	16	**	.31	0	+0.25	+0.25	−0.23*	+0.06	+0.05	+0.17	−0.14	66
1	17	**	.46	−0.36	+0.33	−0.11	−0.27	+0.15	−0.43**	+0.34	+0.08	41
2	17	**	.37	−0.04	+0.47**	0	−0.05	−0.09	−0.06	+0.18	+0.13	63
4	17	**	.49	−0.13	+0.05	+0.35*	−0.34**	+0.01	−0.03	0	+0.31*	50
2	18		.39	−0.79	+0.55**	+0.86	−0.14	−0.12	+0.03	−0.14	+0.21	33
1	19	**	.61	−0.45	+0.71**	−0.27	+0.14	+0.52*	−0.29	0	+0.23	30
4	19	*	.46	−0.11	+0.34	+0.23	−0.51*	+0.13	+0.08	+0.06	−0.48*	33
2	20	**	.95	0	+0.52	+1.21**	−0.47**	−0.88**	−0.71**	0	+0.10	16
3	20	*	.75	+0.14	−0.54	+0.34	+0.20	+0.08	−0.22	+0.49	+0.64*	18

Source: Schiefelbein, E. and C. Clavel. Stability over time of educational input-output relationships. PIEE, Economics Department, University of Chile, ECIEL, Program, 1977.

Note: * means that coefficient is significant at 5%; ** that it is significant at 1%.

Table VIII-3. Chile: Reasons for Quitting School

Reason	% major motive	% major or some influence
School-related factors		
Got very low grades	20.7	32.7
Bored with school work	14.5	24.1
Expelled for disciplinary reasons	2.2	3.5
Started school late (or repeated) and was too old	7.1	9.3
Could not go on to secondary school	6.5	8.5
Could not enter the secondary school desired	5.8	8.3
No secondary schools near home	7.9	8.8
Did not want to go on to higher education	8.7	16.3
Could not enter university	28.7	34.7
Could not get into the university course desired	26.3	31.1
No university near home	10.7	13.0
Economic problems		
Needed income and was obliged to work	22.1	29.6
Had to help family	21.9	30.1
Family could not afford to pay further education	30.1	36.5
Other factors		
Wanted to work	35.8	47.9
Wanted to get married (was married), so had to work	12.7	14.9
Got married and wanted to devote self to family	16.9	18.7
Health did not allow of continued studies	6.0	8.0

Source: Schiefelbein, E. and J. Farrell. Final Report Phase I, Tracer Study Chile. CIDE, Working Documents No. 8, 1978.

Table VIII-4. Chile: Results of Multiple Discriminatory Analysis of Survival by Socio-Economic Analysis

Variables	Weightings assigned according to the Multiple Discriminatory Analysis		
		Socio-economic levels	
	Total sample	Low	High
Average marks in eighth grade	.73	.75	.80
Average socio-economic level of class (2)	.66	.53	.47
Individual socio-economic level	.58	.41	.25
Quality of teaching (1)	.56	.39	.47
Educational aspirations (class) (2)	.55	.45	.43
Average textbook availability (class) (2)	.53	.38	.35
TV in home (class average) (2)	.47	.30	.26
Individual educational aspirations	.45	.37	.25
Individual textbook availability	.45	.38	.21
Training of academic subject teachers	.45	.29	.34
Total score 8th test (individual)	.44	.33	.41
Total score 8th test (class average) (2)	.31	.15	.25
Standard deviation (class)	.23	.30	.05
Family status academic subject teachers (3)	.18	.06	.13
Consumption level academic subject teachers (3)	.16	.13	.05
Population of locality, 8th grade	.18	.03	.03
Taste for academic subjects (individual)	.12	.18	.09
Free reading (individual)	.11	.14	.03
Family value system	.09	.19	.02
Direct encouragement by parents	.06	.12	.01
School size (factor)	.06	.07	.15
Pupil sex	.01	.03	.01
Teaching experience of ac. subject teacher	.01	.07	.07
Modernity of community (class) (2)	.01	.04	.07
Standard deviation verb. score	.01	.01	.05

Source: Schiefelbein, E. and J. Farrell. Nivel y Causas de la deserción en el nivel medio. Revista Educación, No. 68, 1978.

Note 1: Teaching ability is measured by a scale estimated from the replies of directors of laboratories, workshops, library, specialized professional personnel and other similar variables.

Note 2: The class averages are the averages of the replies given by the students interviewed in each class. There are generally ten replies per class.

Note 3: In this case, only data relating to the teachers of Spanish, mathematics, natural and social sciences and languages were considered.

Table VIII-5. Chile: Enrollment in Basic Education (Children), 1966–77

Years	Grades								7-year old population	1st grade enrollment population ratio
	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth		
1966	411,400	305,800	262,200	224,300	180,100	141,100	130,800	79,600	231,806	1.78
1967	408,300	312,500	280,700	238,500	195,000	155,100	138,700	105,300	235,817	1.73
1968	402,900	328,800	295,200	260,500	214,400	174,700	134,400	121,800	239,897	1.68
1969	406,200	326,800	301,200	268,000	225,100	184,400	146,200	113,200	244,048	1.66
1970	395,400	338,300	301,700	277,700	239,200	199,600	159,100	129,000	248,271	1.59
1971	436,100	349,500	318,800	290,800	258,700	220,500	177,300	145,400	246,107	1.77
1972	402,400	375,800	323,900	299,300	268,200	234,900	196,300	159,400	243,962	1.65
1973	407,200	355,900	344,800	305,500	271,600	246,200	208,000	169,700	241,835	1.68
1974	406,200	349,400	330,600	319,800	282,600	248,400	219,800	175,900	239,728	1.69
1975	375,400	346,000	323,400	309,200	294,000	251,500	223,000	176,500	237,638	1.58
1976	354,745	323,971	319,136	302,601	287,022	258,321	220,539	176,939	236,449	1.50
1977	359,000	312,500	304,100	303,000	289,100	258,000	233,000	183,300	235,267	1.53

Source: Superintendencia de Educación, Enrollment Yearbooks, Santiago.
Interpolation of CELADE five-year projections.

Note: Adults not included.

Table VIII-6. Chile: Enrollment (Children) by Ages and Years, 1975
(in thousands, public and private)

Age	Primary								Secondary				University					Total enroll-ment	Popu-lation	%
	1st	2nd	3rd	4th	5th	6th	7th	8th	I	II	III	IV	1st	2nd	3rd	4th	5th			
5	8.9																	8.9	268.5	3.3
6	122.5	9.0																131.6	268.1	49.1
7	138.5	92.3	8.9															239.8	267.6	89.6
8	56.9	115.7	74.8	7.9														255.3	267.2	95.5
9	25.2	61.0	102.9	65.3	7.0													261.4	266.7	98.0
10	12.2	32.7	59.2	95.9	57.6	6.3												263.8	266.3	99.0
11	5.7	17.6	35.1	58.9	91.7	47.2	6.3											262.5	265.8	98.8
12	3.0	9.5	20.9	37.6	59.3	79.9	45.2	6.0	0.2									261.6	265.4	98.6
13	1.4	4.8	12.0	22.9	39.0	54.8	72.1	40.1	4.8	0.2								252.1	260.8	96.7
14	.5	2.1	5.8	12.2	22.2	33.2	48.2	57.8	33.9	3.6	0.2							219.7	256.3	85.7
15	.3	.8	2.5	5.9	11.5	19.2	30.8	39.4	54.1	24.4	2.8	0.1						191.8	251.9	76.1
16	.1	.2	0.8	1.9	4.1	7.9	14.1	21.3	40.1	39.3	18.7	2.7	.1					151.3	247.6	61.1
17	.1	.1	.2	.6	1.2	2.0	4.3	6.9	21.6	28.3	31.2	15.4	2.0	.1				114.0	243.3	46.9
18						0.4	0.5	1.7	7.0	16.1	23.1	22.9	9.8	2.0	.1			83.6	234.1	35.7
19							0.1	0.3	1.5	5.7	12.2	13.8	10.9	8.9	2.0	.1		55.5	225.3	24.6
20									0.3	1.5	4.9	6.5	5.0	9.2	7.4	1.8	.1	36.7	216.8	15.9
21									0.1	0.4	1.5	2.4	3.2	4.5	7.7	6.2	1.3	27.3	208.7	13.1
22										0.1	0.4	1.2	2.9	4.2	3.5	5.9	3.3	21.5	200.9	10.7
23											0.1	0.2	2.4	2.8	3.7	3.1	3.2	15.5	197.4	7.9
24												0.1	2.0	2.4	2.7	2.1	3.0	12.3	193.9	6.3
25–29													2.0	1.9	2.2	2.0	1.7	9.8		
30 and +													1.5	1.3	1.6	1.2	2.0	7.6		
Total	375.3	345.8	323.1	309.1	293.6	250.9	221.6	173.5	163.6	119.6	95.1	65.3	41.8	37.3	30.9	22.4	14.6	2883.6		

Source: Superintendencia de Educación. Distribución por edades simples y grados. Año escolar 1975 (Amended version); Council of Presidents of Chilean Universities. Anuario Estadístico, 1976; Boletín Informativo No. 32. Santiago, May 1977; CELADE, Boletín Demográfico, Year IX, No. 18, Santiago, July 1976, pp. 20–21.

Note: Does not include 5,075 students in the fifth year of technical education (0.1 of 17; 0.7 of 18; 1.6 of 19; 1.3 of 20; 1.4 of 21) or 23,125 in special education. Adults enrolled in evening or night schools are not included.
The population calculated by CELADE was increased by 20,000 in each age to exceed the figures provided by the Ministry of Education.

Table VIII-7. Chile: Estimated Repetition Rates in First Grade, 1970–1977.

Year	New Students	1st grade		2nd grade	Repetition rate in first grade	
1970	276,8	395,4		338,3	maximum[1]	minimum[2]
		165.6	229.8	119.7	41.9	40.6
1971	270.5	436.1		349.5		
		131.4	304.7	71.1	30.1	28.8
1972	271.0	402.4		375.8		
		135.4	267.0	88.9	33.6	32.4
1973	271.8	407.2		355.9		
		133.9	273.3	76.1	32.9	31.7
1974	272.3	406.2		349.4		
		102.4	303.8	42.2	25.2	24.0
1975	273.0	375.4		346.0		
		81.1	294.3	29.7	21.6	20.3
1976	273.6	354.7		324.0		
		84.7	227.8	84.7	23.9	22.6
1977	274.3	359.0		312.5		

Source: Tables VIII-5 and VIII-6.

Note 1: No dropping out assumed.

Note 2: Students begin to drop out from age 14 on (see enrollment ratios in Table VIII-6) and it is assumed that those who leave first are the ones in first grade. According to Table VIII-6 the number would be a few thousand; to set a lower limit, 5000 were assumed to drop out.

Table VIII-8. Chile: Average Number of Students Per Teacher in Public and Private Basic Education, By Size of School Enrollment, 1974 School Year

Size	Public			Private			No. of teachers	
	Total	Urban	Rural	Total	Urban	Rural	Public	Private
Total	**40.4**	**38.0**	**45.5**	**54.5**	**51.4**	**125.6**	**48,418**	**8,829**
1- 200	44.6	23.0	49.7	51.3	32.0	173.9	7,403	1,672
201- 500	35.4	33.6	38.9	42.9	42.7	50.1	10,142	3,748
501-1 000	39.0	38.9	40.5	63.1	63.2	50.9	16,295	2,573
1 001-1 500	42.7	42.7	43.3	91.4	91.4	—	9,952	462
1 501 and over	44.7	44.6	52.3	80.8	80.8	—	4,626	374

Source: Tabulations of 1974 enrollment data from Superintendencia de Educación.

Table VIII-9. Chile: Percentage of Terminal Establishments by Education Level in Relation to Total for Each Area. 1974 School Year

Geographic Area	Basic		Secondary		Secondary	
	Public	Private	Public	Private	Public	Private
Total	**35.6**	**35.8**	**72.1**	**91.4**	**78.8**	**93.8**
Urban	81.8	53.9	73.7	91.4	78.6	96.8
Rural	12.9	3.5	0.0	100.0	81.6	60.0

Source: Tabulations of 1974 enrollment data from Superintendencia de Educación.

Table VIII-10. Chile: Enrollment in Public Prebasic Education. First Grade Basic (Public) Enrollment, Repetition and Promotion by Regions, 1975

Region	Prebasic Enrollment (public) 1975 A	1st Year Basic enrollment (public) 1976 B	Ratio of pre-basic to 1st. grade A:B	% Promotion 1976	% Repetition 1976	Preschool population PEX 1977
Total	**66,406**	**295,593**	**.22**	**70.9**	**19.8**	**35.84**
A. Metropol.	22,932	82,488	.27	79.7	12.0	35.56
I.	2,156	5,620	.38	83.1	11.0	35.94
II.	2,332	8,665	.26	79.3	10.2	35.66
III.	1,155	5,566	.20	74.4	17.1	36.66
IV.	2,869	13,341	.21	72.6	20.6	37.03
V.	7,273	29,069	.25	68.1	20.5	35.63
VI.	2,902	18,251	.15	69.1	23.5	36.10
VII.	4,437	26,078	.17	66.7	23.9	36.32
VIII.	8,058	50,442	.15	70.2	19.0	36.28
IX.	5,577	22,122	.25	69.4	24.7	36.65
X.	5,254	29,763	.17	68.6	28.9	35.72
XI.	509	2,246	.22	62.6	20.0	36.97
XII.	952	1,942	.49	84.9	11.1	34.41

Source: Prepared by J. Filp and C. L. Latorre using data from Superintendencia de Educación, CIDE, 1978.

Table VIII-11. Chile: Population by Socio-Economic Strata

Age Group	Rest			Poor			Total		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
0–5	238,642	113,233	351,875	943,240	263,235	1,206,475	1,181,882	376,468	1,558,350
6–11	335,414	159,151	494,565	929,574	216,389	1,145,963	1,264,988	375,540	1,640,528
12–13	111,805	53,050	164,855	284,470	58,963	343,433	396,275	112,013	508,288
14–19	252,975	120,035	373,010	268,625	131,875	900,500	1,021,600	251,910	1,273,510
20 and over	1,026,848	487,230	1,514,078	3,376,208	784,794	4,161,002	4,403,056	1,272,024	5,675,080
Total	**1,965,683**	**932,709**	**2,898,383**	**6,302,118**	**1,455,255**	**7,757,373**	**8,267,801**	**2,387,965**	**10,655,766**

Table VIII-13. Paraguay: Enrollment Ratios by Grades, 1964–76

Year	Total	1st	2nd	3rd	4th	5th	6th
1964	344,637	117,344	81,181	58,105	41,077	27,828	19,102
1965	356,998	118,822	84,215	59,867	43,054	29,727	21,313
1966	365,932	119,531	84,921	62,729	44,796	31,438	22,517
1967	378,463	120,810	88,608	64,441	47,409	32,968	24,227
1968	399,685	120,544	94,760	69,050	51,103	36,859	27,369
1969	408,524	119,784	94,320	72,769	53,250	38,819	29,582
1970	424,179	125,052	96,799	74,661	56,602	40,725	30,340
1971	436,857	126,034	99,585	77,467	58,009	43,397	32,365
1972	440,151	125,983	98,826	79,252	59,114	43,878	33,098
1973	451,530	126,077	100,796	80,675	62,147	46,789	35,046
1974	454,853	124,709	100,324	82,160	63,299	47,874	36,487
1975	452,249	121,736	99,139	81,889	63,763	48,283	37,439
1976	467,552	128,537	100,560	83,343	65,693	50,249	39,170

Source: Unpublished figures provided by Directorate of Planning, Ministry of Education, Asunción, 1977.

Table VIII-12. Chile: Number of Schools Per Grade/Sector, 1974

Highest Grade attended	Public	Private	Total
Up to 1st.	6	20	26
Up to 2nd.	27	50	77
Up to 3rd	59	98	157
Up to 4th	383	299	682
Up to 5th	474	165	639
Up to 6th	2,815	543	3,358
Up to 7th	385	45	430
Up to 8th	2,296	684	2,980
Total	**6,445**	**1,904**	**8,349**

Source: PREALC. Antecedentes para la planificación de los Recursos Humanos en Chile, PREALC/118, julio 1977.

Table VIII-14. Paraguay: Enrollment Ratios by Single Ages, 1965–75

Age	1965			1970			1972			1975		
	Pop'n.	Enrol.	%	Pop'n.	Enrol.	%	Pop'n.	Enrol.	%	Pop'n.	Enrol.	%
7	61,761	52,527	85	68,875	61,806	90	73,185	63,921	88	82,461	66,260	81
8	60,236	51,516	86	67,062	59,659	89	71,117	63,698	90	79,892	65,367	82
9	58,738	49,948	85	65,298	60,299	92	69,138	63,265	92	77,373	66,672	86
10	57,313	49,984	87	64,104	59,995	94	67,215	60,813	91	72,365	59,617	82
11	56,029	44,203	79	62,416	52,963	85	65,313	58,187	91	72,365	59,617	82
12	54,306						63,513	55,628	88			
13	51,885						61,839	42,0[illegible]7	68			
14	49,034						60,221	30,240	50			
15	46,291						58,603	17,801	30			
16	43,561						57,045	11,228	20			

Source: PREALC. Recursos Humanos en Paraguay 1975–1990. PREALC/102, September 1976 and unpublished figures from the Directorate of Planning, Ministry of Education.

Table VIII-15. Paraguay: Estimated Repetition Rates in First Grade, 1964–76

Year	95% of the 7-year old population[1]	First grade enrollment	Estimate of repeaters	Estimate repetition rates	Repetition rates reported by the schools
1964	57,408	117,204	59,936	51	28
1965	58,673	118,822	60,149	51	29
1966	59,966	119,531	59,565	50	30
1967	61,288	120,810	61,522	51	30
1968	62,639	120,544	57,905	48	26
1969	64,020	119,784	55,764	47	27
1970	65,431	125,052	59,621	48	25
1971	67,830	126,034	58,204	46	26
1972	70,317	125,983	55,666	44	25
1973	72,895	126,077	53,182	42	26
1974	75,567	124,709	49,142	39	25
1975	78,338	121,736	42,398	35	24
1976	81,210	128,537	47,327	37	22

Source: Tables VIII-13 and VIII-14.

[1] A study for the period 1973–78 suggests that 92% of each cohort enters the system. However, in order not to overestimate the repetition rate, 95% of each 7-year old cohort was taken as the maximum hypothesis.

Table VIII-16. Paraguay: Percentage of Schools Offering Complete Schooling by Sector, 1976.

Top grade offered	Urban			Rural			
	Public	Private	Total	Public	Private	Total	Total
1st and 2nd	4%	10%	3%	50%	79%	19%	16
3rd and 4th			3%			35	29
5th and 6th	96	90	94	50	21	46	55
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
schools	(360)	(185)	(545)	(2,101)	(314)	(2,415)	(2,960)
students	145,844	47,878	193,722	252,556	21,274	273,830	467,552

Source: 1976 Yearbook, Statistics Unit, Directorate of Education Planning, Ministry of Education and Worship, Asunción, 1978.

Table VIII-17. Paraguay: Distribution of School Population by Class Size, 1976 (Sample of 10% of Schools)

Departments	Class size 6–20	21–25	26–30	31–35	36–40	41–45	46 and over
Asunción	4	5	2	7	1	—	—
Concepción	1	2	3	3	3	1	3
San Pedro	3	8	4	3	4	1	2
Cordillera	4	6	3	5	5	—	—
Guairá	4	5	5	3	2	1	—
Caaguazú	4	6	7	4	3	3	4
Caazapá	4	2	5	4	1	1	—
Itapúa	8	13	7	5	2	2	1
Misiones	1	3	4	—	2	1	1
Paraguari	5	15	9	6	1	—	—
Alto Paraná	1	1	5	2	2	2	1
Central	—	4	4	9	5	—	—
Ñeembucú	6	2	1	—	4	—	1
Amambary	4	1	1	1	1	1	—
Canendiyú	2	1	—	1	1	—	—
Western Region	4	2	2	3	1	—	1
Total	**55**	**76**	**82**	**56**	**38**	13	14

Source: Características del sistema de educación primaria y sugerencias de alternativas para incrementar su eficiencia, Estudios del funcionamiento del sistema de educación del Paraguay No. 6. Ministry of Education, Directorate of Planning, Asunción, April 1978.

Table VIII-18. Paraguay: Rotation of Teachers in Various Types of Schools, by Urban and Rural Areas, 1976

Category	Teacher rotation With		Without		Total
Urban	60%	(44)	40%	(29)	(73)
Schools with women teachers					
Top grade 1st or 2nd	—	—	—	(1)	1
Top grade 3rd or 4th	—	(1)	—	(2)	3
Top grade 5th or 6th	54%	(14)	46%	(12)	26
Schools with mixed teaching staff					
Top grade 1st or 2nd	—	—	—	—	—
Top grade 3rd or 4th	—	—	—	—	—
Top grade 5th or 6th	67%	(29)	33%	(14)	43
Rural	33%	(77)	67%	(155)	(232)
Schools with women teachers					
Top grade 1st or 2nd	27%	(9)	73%	(24)	(33)
Top grade 3rd or 4th	33%	(22)	67%	(45)	67
Top grade 5th or 6th	42%	(27)	58%	(38)	65
Schools with mixed teaching staff					
Top grade 1st or 2nd	—	—	100%	(9)	9
Top grade 3rd or 4th	29%	(5)	71%	(12)	17
Top grade 5th or 6th	21%	(14)	79%	(27)	67
Total	**40%**	**(121)**	**60%**	**(184)**	**305**

Source: Ministry of Education and Worship. Tabulation of 1976 sample.

Table VIII-19. Paraguay: Highest Grade Offered by School According to Size and Whether or Not It Has Multigrade Classes, 1976

Grades offered by school	School size: Up to 70		71–150		151 and over		Total cases estimated for universe
	With	W'out	With	W'out	With	W'out	
Up to 2nd	23%	74%	0	4%	0	0	450
Up to 4th	54	21	48	57	0	1	[illegible]
Complete	23	5	52	39	100	99	1,750
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**3,050**
Distribution 1976	21%	11%	13%	15%	6%	33%	100%

Source: Table VIII-16

Table VIII-20. Paraguay: Multigrade Classes in Rural Areas (Only), by Shifts and Grades Offered, 1974–1976

Rural schools	Single shift: Incomplete	Complete	One or more shifts: Incomplete	Complete	Total cases in sample
With multigrade classes	67%	—	55%	37%	81
Without multigrade classes	33%	—	45%	63%	87
Total (1974)	**100%**	—	**100%**	**100%**	**168**
Distribution	14%	—	39%	46%	(100%)
With multigrade classes	67%	—	48%	39%	105
Without multigrade classes	33%	—	52%	61%	119
Total (1975)	**100%**	—	**100%**	**100%**	**224**
Distribution	13%	—	44%	42%	(100%)
With multigrade classes	72%	—	48%	45%	115
Without multigrade classes	28%	—	52%	55%	117
Total (1976)	**N.S.**	—	**100%**	**100%**	**232**
Distribution	13%	—	41%	46%	(100%)

Source: Table VIII-18

Table VIII-21. Paraguay: Number of Incomplete Rural Schools, by Size, Number of Shifts, With or Without Multigrade Classes and Highest Grade Offered, 1976

School	Up to 70 students: One shift	Two shifts	71–150 students: One shift	Two or more shifts	Total
With 1st to 2nd	140	10	0	0	150
1st to 4th	70	270	10	180	530
Without 1st to 2nd	60	180	0	20	260
1st to 4th	10	60	0	240	310
Total	**280**	**520**	**10**	**440**	**1,250**

Source: Table VIII-18.
Note: The sample was amplified by 10 to obtain an estimate of the universe.

Table VIII-22. Paraguay: Number of Incomplete Rural Schools, by Size, Number of Shifts and Class Size, 1976

Average class size	Up to 70 students		71 to 150 students		
	One shift	Two or more shifts	One shift	Two or more shifts	Total
24 students or under	100	310	—	10	510
25 to 30	60	150	—	80	290
31 and over	120	60	10	200	450
Totals	**280**	**520**	**10**	**440**	**1,250**

Table VIII-23. Paraguay: Estimate of Cost of Completing Schools in Rural Areas

Characteristics of Schools	No. of schools	No. of classrooms	No. of teachers[1]
Up to 70 students			
Single-shift			
With multigrade classes	210	—	180
Without multigrade classes	70		
Two-shift			
With multigrade classes	280	210	210
Without multigrade classes	240		
71 to 151 students			
Single-shift			
With multigrade classes	10	10	10
Two-shift			
With multigrade classes	180	180	180
Without multigrade classes	260	260	260
	1,250	660	840
Unit cost		US $7,500	1,500
Total Cost (US$ millions)		**4.95**	**1.26**

[1] Teacher positions will not be created where there are classes of 24 or fewer students.

Table VIII-24. **Paraguay: Estimate of Primary Enrollment in Period 1978–88, Assuming Constant Promotion Rates**

Year	New students	1st Grade	Promoted to 2nd Grade	2nd Grade	Promoted to 3rd Grade	3rd Grade	Promoted to 4th Grade	4th Grade	Promoted to 5th Grade	5th Grade	Promoted to 6th Grade	6th Grade
1977		127.1		104.8		83.6		67.5		52.0		40.9
		57.2	63.5	37.7	61.8	25.1	52.7	16.9	45.2	7.8	38.5	4.1
1978	81.1	138.3		101.3		81.9		69.6		52.2		42.5
		62.2	69.2	35.4	59.8	26.1	51.6	17.4	41.6	7.8	38.6	4.3
1979	83.0	145.2		104.6		85.9		69.0		54.4		42.8
		65.3	72.6	36.6	61.7	25.7	54.1	17.2	46.2	8.2	40.3	4.3
1980	84.7	150.0		109.2		87.4		71.3		54.4		44.6
		67.5	75	38.2	64.4	26.2	55.1	17.8	47.8	8.2	40.2	4.5
1981	86.8	154.3		113.2		90.6		72.9		56.0		44.8
		69.4	77.2	39.6	66.8	27.2	57.1	18.2	48.8	8.4	41.4	4.5
1982	88.7	158.1		116.7		94.0		75.3		57.2		45.9
		71.2	79.0	40.9	68.5	28.2	59.2	18.8	50.5	8.6	42.3	4.6
1983	90.6	161.8		119.9		97.1		78.0		59.1		46.9
		72.8	80.9	42.0	70.7	29.1	61.2	19.5	52.3	8.9	43.7	4.7
1984	92.5	165.3		122.9		99.8		80.7		61.2		48.4
		74.4	82.6	43.0	72.5	29.9	62.9	20.2	54.1	9.2	45.3	4.8
1985	94.4	168.8		125.6		102.4		83.1		63.3		50.1
		75.9	84.4	44.0	74.1	30.7	64.5	20.8	55.7	9.5	46.8	5.0
1986	97.3	173.2		128.4		104.8		85.3		65.2		51.8
		78.0	86.6	44.9	75.8	31.4	66.0	21.3	57.2	9.8	46.8	5.2
1987	100.2	178.2		131.5		107.1		87.3		67.0		53.4
		80.2	89.1	46.0	77.6	32.1	67.5	21.8	58.5	10.0	49.6	5.3
1988	103.0	183.2		135.1		109.7		89.3		68.5		54.9 640.7

Note 1: The main figures represent the enrollments; each column gives the figures for one grade and also the number of repeaters. The number of students promoted from the previous grade is shown between columns.

Note 2: For these estimates the estimated rates for 1977 were used as the promotion rates for the first six grades, vis. 50%, 59%, 63%, 67%, 74% and 81%, and similarly for the repetition rates, vis. 45%, 35%, 30%, 25%, 15% and 10%. These were maintained constant for the entire period.

Table VIII-25. Paraguay: Estimate of Primary Enrollment in the Period 1978–88

Year	New students	1st Grade	Promoted to 2nd Grade	2nd Grade	Promoted to 3rd Grade	3rd Grade	Promoted to 4th Grade	4th Grade	Promoted to 5th Grade	5th Grade	Promoted Promoted 6th Grade	6th Grade
1977		127.1		104.8		83.6		67.5		52.0		40.9
		57.2	63.5	37.7	61.6	25.1	52.7	16.9	45.2	7.8	38.5	4.1
1978	81.1	138.3		101.2		86.9		69.6		52.2		42.5
		62.2	71.9	35.4	60.7	26.1	54.7	17.4	46.6	7.8	38.6	4.3
1979	83.3	145.5		107.3		86.7		72.1		54.4		42.9
		62.6	77.1	36.5	64.4	25.2	55.5	17.3	49.0	8.2	40.8	4.3
1980	85.6	148.2		113.6		89.6		72.8		57.2		45.1
		60.8	78.5	36.3	70.4	25.5	59.1	16.7	50.2	8.6	42.9	4.5
1981	88.0	148.8		114.8		95.5		75.8		58.8		47.4
		59.5	81.8	35.6	72.3	25.8	64.0	16.7	53.8	8.2	44.7	4.7
1982	90.4	149.9		117.4		98.1		80.7		62.0		49.4
		57.0	85.4	35.2	76.3	25.5	67.7	16.9	58.1	8.7	47.1	4.9
1983	92.9	149.9		120.6		101.8		84.6		66.8		52.0
		57.0	88.4	35.0	80.6	25.5	71.3	17.8	61.8	9.3	51.4	5.2
1984	95.4	152.4		123.3		106.3		89.1		71.1		56.6
		53.3	93.0	34.5	83.8	25.5	76.5	17.8	66.8	10.0	55.5	5.7
1985	98.0	151.3		127.5		109.3		94.3		76.8		61.2
		51.4	95.3	34.4	89.3	25.1	79.8	17.9	71.7	10.7	59.9	6.1
1986	100.7	152.1		129.7		114.4		97.7		82.4		66.0
		50.2	98.9	33.7	92.1	26.3	85.8	17.6	75.2	10.7	65.1	6.6
1987	103.5	153.7		132.6		118.4		103.4		85.9		71.7
		47.6	104.5	33.2	96.8	26.0	90.0	18.6	81.7	11.2	67.9	7.2
1988	106.4	154.0		137.7		122.9		108.6		92.9		75.1 691.2

Note 1: Table starts with accepting 92% of the 7-year cohort and finishes with 95% in the last year. This results from the possibility of serving students who would not be able to enter the system without appropriate encouragement.

Note 2: The numbers promoted and repeating were estimated by using the rates in Table VIII-24.

CHAPTER IX

Education and Rural Development in Latin America

Richard Sack, Martin Carnoy[1] and Claudia Lecaros

A. PRESENTATION OF THE PROBLEM

1. Overview

The subject of education and agricultural or rural development raises several sets of questions whose answers are not necessarily complementary. Furthermore, the analytical processes by which these questions are approached would vary according to one's value assumptions about the matters at hand. The problem is further complicated by the intimate interaction between education and other factors of production, social structure, political and economic choices, and personality variables. Indeed, throughout the literature on the relationships between education and agricultural development we find the recurring caveat that, whereas educational development may be a necessary factor in rural development, it should not be considered a sufficient one (see, for example, Foster & Sheffield (13)). In this paper we shall review various questions relating to educational and agricultural and rural development in Latin America by examining the relationship between education and agricultural productivity, the impact of various types of educational formats on rural life and development, and how the interrelationships between education and social structure affect rural development and agricultural productivity. We conclude with the policy implication of our findings.

One important distinction to be made is that between agricultural and rural development. This leads us to a general discussion of development theories and their implications for rural life. If we were to limit our interests to agricultural production, we would address ourselves mainly to the topics of whether education increases agricultural productivity and, if so, how. We recognize, however, that there is an intimate relationship between the structure of agricultural development and other factors that combine to constitute the general fabric of rural life and the tenor of rural development. An extreme example would be the opposition between plantation and small-holding agriculture: in the former, individuals are employees enmeshed in a hierarchical structure and working for a large (and often foreign) firm whereas, in the latter, the individual producers own their land and are directly interested in efforts at innovation and increase in production. In these two forms of the organization of agriculture the implications for educational policy are obvious and extensive. It becomes clear, therefore, that development of the rural sectors of society is a much broader set of problems than the (conceptually) simple problem of the development of agricultural production. The implications of this distinction for educational policy will be discussed in depth later in this paper.

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The issue of land tenure conditions cannot be neglected in understanding the processes of rural development and agricultural productivity. We also regard this factor as important in evaluating the contribution various types of education can make to both rural development and agricultural productivity. The major mediating factor between land tenure and education is the motivation of the individuals concerned and their resulting receptivity to the substance of the educational efforts directed at them. Individual agricultural producers who are motivated to increase production because of greater perceived rewards are likely to be receptive to educational efforts whose goals are to stimulate greater productivity. Motivation, or a perception of personal interest, is a crucial factor in ensuring the success of any educational endeavor, especially one aimed at so specific a goal as the development of a particular sector of the economy.

Another factor of concern for those interested in problems of rural development is the phenomenon of migration from the rural areas to the cities. This migration is viewed as depleting the rural areas of needed human resources while inflating the urban populations with armies of unemployed, who are often not directly productive and represent a large burden on the forces of social equilibrium. How, it is asked, can education contribute to rural development by educating people to desire to remain productive in the rural areas rather than emigrating to the cities? This is a question of concern to educators and planners all over the Third World, especially as education often appears to have the effect of promoting migration to the cities rather than inciting rural dwellers to remain productive in agriculture. Again, we shall analyze this problem as part and parcel of the larger mosaic of social and economic conditions in the rural world rather than suggest that adjustments and reforms in education can be the solution.

In attempting to understand the contribution education can make to rural development and agricultural productivity, we shall have to consider the various educational formats available. In addition to the traditional forms of formal schooling, we will consider extension education, literacy training, adult education, and non-formal education in general. In other words, we are saying that education is not a monolithic construct: there is "education" and "education", and the impact, usefulness, and effectiveness of educational efforts can vary greatly according to the relationship between educational format and the social and economic structures of the larger setting.

This leads us to the fundamental tenet of our analysis: that the possible contributions of education to developmental efforts are dependent on the social and economic contexts. We are suggesting that it is useless to consider educational changes and reforms without analyzing how the social and economic structures of the target populations might affect their receptivity to the educational efforts aimed at them. Furthermore, we recognize that, whereas education *may* have a role to play in the processes of rural development and of increasing agricultural productivity, the major factors determining progress in these areas are related to the broader topics of social and economic organization or rural life. No amount of well conceived education can be expected to motivate rural dwellers who are alienated from the products of their labor, let alone provide them with reasons for remaining in the rural areas rather than yielding to the temptations and the promises (often false) of the city life.

The critical educational question, then, becomes similar to the critical economic question posed by Schultz in his work on *Transforming Traditional Agriculture* (47). He asks: "Under what conditions does it pay to invest in agriculture?" Here we are asked: Under what conditions does it pay to invest in education in rural areas? First, we must examine the putative benefits of investing in education in the agricultural sector. Perhaps the major benefit of education in the agricultural sector, as perceived by many writers in the field, is that farmers are more able to modernize their production techniques and habits as they become better educated. In the first place, it is argued, they become able to adapt more modern methods to their farming, including mechanization and use of newer and better seeds and fertilizers, and acquire the ability and desire to use newer techniques of irrigation, planting, maintenance of equipment, etc. In other words, a predisposition to innovation is considered one of the main benefits of investment in education in rural areas.

Schultz (47, pp. 178–182) points out that, from a historical perspective, it is difficult to show a relationship between agricultural growth and the acquired capabilities of farm people. Periods of important agricultural growth did not await investments in better schooling and training, which often came later along with consumption goods. However, much of the past growth in agricultural production is related to the settlement of the Americas, Australia, and New Zealand, whose vast expanses of new lands were farmed by Europeans by their usual methods. In addition, modernization of transportation and a decline in transport costs contributed to the increased productivity of farming in these areas, where the major characteristic of farm workers was physical vigor and stamina. Schultz also points out that rapid mechanization of field crops in the Soviet Union did not wait for the introduction of better schooling, although efforts were made to introduce short courses and training schools for machine operators. There is even one form of agricultural production where education was viewed as being dangerous: this was in plantation economies based on some form of slavery. Schultz (47, p. 181) concludes that "it is hard to discern any clear-cut historical cases that support" a relationship between investment in farm people and favorable effects on agricultural production.

However, Schultz (47, p. 181) goes on to suggest that "there are all manner of historical clues indicating that there has been a strong positive relation between the level of skills and knowledge of farm people and their productivity at farming." He cites examples of immigrant farmers arriving in the Americas in this century who out-performed their neighbors who were less endowed with training and knowledge. He suggests that a cursory examination of the historical data indicates that "the relative increase in production that immigrants achieve over the production of their indigenous neighbors rests on a difference in useful skills and knowledge in which the immigrants ... have had a measurable advantage." (47, p. 182).

Furthermore, we are no longer living in a period of large-scale development of new lands and new immigrations. We are in a period of consolidation where it becomes necessary to expand production on relatively constant areas of land. Malassis (35) is rather adamant in stating that production must be increased if famine is to be avoided in a world of demographic expansion and greater demands on the global food supply. Although the situation may not be as drastic as Malassis (writing for UNESCO) paints it, we are indeed faced with a situation of having to expand the present panoply of factors of agricultural production in order to maintain economic and social stability and assure growth and progress. Education might be one of these factors, as is technology, which demands some expertise on the part of farm workers. The social and economic structure of agriculture must also be considered one of these factors.

Such is, in broad perspective and several paragraphs, the scope of our problem. We shall attempt to state it in more detailed terms and analyze its major dimensions and the interactions among factors affecting rural development in Latin America. Although our major dimensional factor is education and its possible effects on rural development and agricultural production, we cannot neglect the intimate interactions between social structure and educational attainment, motivations, effectiveness, and format.

2. The socio-economic context: rural development and agricultural productivity

In his study on economic development in Latin America, Celso Furtado (27, p. 51) states that "In Latin America, agrarian structures are not only an element of the production system, but also the basic feature of the entire social organization." Since colonial times the prevailing type of agrarian structure that has provided the basic framework for Latin America's social patterns is characterized by the dual pattern of latifundio-Indian community and latifundio-minifundio. Furtado points out that the indigenous communities were transformed into instruments of social control and, therefore, it is the relationship between the latifundio and minifundio that dominates the region's agrarian structures. This is reinforced by the fact that, from the economic perspective, the indigenous communities became a constellation of minifundios. Tables IX-1 and IX-2 show the importance of these types of landholdings for selected countries in Latin

America, excluding those that have undergone drastic land reforms (Mexico, Bolivia and Cuba).[2]

The data in the above tables, plus those in Table IX-3, indicate that the large landholdings dominate the agrarian structures in terms of area but not necessarily in terms of productivity. We find a combination of under-utilization of land in the latifundist category along with high labor productivity. This is due to the way in which the land is used as well as the particularly good quality of the latifundist land.

From Table IX-3 we see that, in all but Mexico and Venezuela, population growth essentially equaled or exceeded agricultural production. Without raising cries of the danger of famine,[3] we are impressed by the magnitude of the problem at hand and by the need to develop factors of agricultural production capable of increasing it well beyond the rate of demographic growth. This is the least that must be done if rural poverty is to be alleviated. Furtado argues that, in Mexico, the land reform program of the 1930's, coupled with government investments in agricultural infrastructure and fertilizers, was responsible for the development of the agricultural sector that occurred in the relative absence of natural resources favorable to agricultural development (27, p. 117).

The relationship between education and land tenure arrangements is shown by Barraclough. He points out that there is a distinct tendency for less education to be provided to farm workers on large estates (4, p. 20). He further argues that on large estates farm workers have little reason to be interested in modern technology and management. As long as these people have little or no control over the land they work, there is little incentive for them to be interested in the modernization of agricultural production and, therefore, educational efforts in that direction. This situation is a direct result of tenure patterns and suggests that it is indeed difficult to dissociate the issues of rural development and agricultural productivity.

Our examination of the problem leads us to view the issue as a not too intricate matrix of structural, productive, and human factors, all of which combine to determine the development of any one of them, inside the "seamless web" of rural development. Education, the major concern of this investigation, will be effective in improving agricultural productivity only if the interested parties—the individual farmers themselves—have a sense of personal interest at stake. This can only happen if the structural conditions—socio-economic and land tenure factors—are such that the individuals are motivated to remain in the rural areas and acquire the skills and knowledge necessary for increasing agricultural productivity. Dissemination of skills and knowledge so essential for the introduction of innovative methods of farming is basically the domain of education (although, not necessarily of schooling).

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[2] Minifundio means a plot of land too small to provide full employment for one family and to yield income sufficient to sustain an adequate minimum standard of living. Latifundio means an estate employing more than 12 full-time workers. Family farms provide work for 2-4 people. Medium-sized (or multi-family) farms employ 4-12 workers. Both tables are dated 1966. (From Furtado, 27, pp. 54-55).

[3] This is the line adopted by Malassis (35).

3. Education and the rural problem

A first, and extremely important, distinction that needs to be made is that between schooling, or formal schooling, and education in the broader sense. We all know what formal schooling is about: the organization of education into a well-developed institutional framework. We usually witness this formalization of education in the form of classrooms, grades with regular progression from one to another, the organization of knowledge into formalized units we call courses, learning periods organized into discrete time segments (school years and course periods), a divorce between the learning experience and the productive activities of daily living, and a hierarchical structure where learners and teachers are strictly separated. In Latin America we find this form of education particularly prevalent in the urban areas, although certainly in evidence in rural areas (Moreira, 38).

Formal schooling is not, however, the only way in which education is dispensed. The first arena for learning is, of course, the family. In addition, in traditional societies the family has been the major structural arena for production. This means that learning and production were traditionally integrated into the same institutional framework. Formal schooling institutions were developed in the context of urban industrialization, where economic production became divorced from family life. In areas of production that are not part of the urban industrialized sector of society it is probably appropriate to think of formal schooling as not the most effective (and efficient) means for imparting the knowledge necessary for improvements in agricultural production. Much of the recent work in this area has been concerned with reintegrating education into production. This has often taken the form of recommendations for greater efforts in the areas of adult education, extension training, and non-formal education in general (see, for example, Wilson, 51).

One of the principal areas of concern to educators and planners studying rural development is literacy, which is generally thought of as being the primary benefit of elementary education. Foster and Sheffield (23, pp. 1-11) suggest that the major impact of schooling is through the diffusion of literacy. They indicate that the impact of schooling is indirect and occurs through literacy which, in turn, leads to a rise in the general level of communication skills among farmers. This, they argue, is more important than the direct utilization of any specific agricultural expertise acquired in schools. As evidence, they point out that studies of the rate of return on schooling in many less developed countries show that the social returns are greater for primary education than for secondary or higher education. They conclude by suggesting that the major requirements for development in the least developed sectors of less developed countries is the acquisition of basic literacy and numeracy skills by the population. The acquisition of a "critical mass" of these skills seems to be a necessary, if not a sufficient, condition for rural development, especially if it is to be based on technical and structural innovation.

In this context it is difficult to ignore Cuba's experience in attempting to integrate education into the structure of agricultural production since the advent of the present revolutionary regime. As Carnoy and Werthein (14, p. 580) describe the educational reforms in Cuba, "the schools represent a profound reform in the Cuban educational system, a reform that is a response to the low productivity in the countryside in the 1960's, to the shortage of rural labor, and to the commitment of Cuban leadership to agricultural development as the lead sector in economic growth." These reforms were aimed at mobilizing the working forces in rural Cuba via a total integration of learning and production and a strong collectivist ideological bias in the educational experiences provided. This included the development of new values, as well as skills, as part of the learning processes, the revitalization of the prestige of rural life and production by shifting teachers' orientation toward the rural areas and creating boarding schools in these areas, and a general extra-scholastic campaign to boost the social value of rural living. Also, there has been a direct relationship between schooling and production as agricultural production becomes part of the curriculum and the activities of the school. The well-known literacy campaign of the immediate post-revolutionary period appears to have succeeded, in that most rural dwellers are now literate and the urbanites who participated in that experience are more aware of rural problems than before. Furthermore, there was a general shift of educational resources from the urban to the rural sectors of the Cuban society. This was coupled with the de-emphasis of industrial development after 1963 in favor of the expansion of the agricultural sector.

The crucial question, of course, is the effectiveness of these efforts. Carnoy and Werthein (14, p. 581) conclude that, although one must attribute economic progress to direct intervention in the economic system, "in the longer run, the concentration on education probably did contribute to economic growth, particularly in the industrial sector and in (parts of) the agricultural sector." Perhaps even more important is the fact that, through mass education, people in the rural areas have been brought into the mainstream of Cuban development.

In evaluating the benefits of formal schooling its traditional subdivisions—primary, secondary and higher education—must be examined. The major benefits derived from primary education are principally those of literacy and numeracy: basic communicative skills that enable rural dwellers to communicate with the rest of the national community and to consume written materials of interest to them in their productive activities. Secondary education becomes more specialized and often has the effect of orienting its pupils toward urban life. This need not be the case; it is here, however, that we witness the sharpest contradictions between the goals of the educational planners and the effects of their efforts. Secondary education is too often oriented toward the urban scene and has the effect of instilling those aspirations in its subjects. Higher education is also important in creating the high-level expertise needed for certain aspects of rural development: the development of innovative techniques for farming; research into agricultural process utilizing new seeds, fertilizers, and methods; and work on the development of new agricultural products. University graduates are often necessary connecting links between advanced research and application.

We must remember, however, that education is not a free good. In most Latin American countries, expenditures on schooling represent more than 4% of the national product, but only a small percentage of this public expenditure goes to rural areas. In most countries about one-third goes to higher education, which is largely restricted to higher social class, urban youth. Less than half of the educational budget goes to primary education and most of that is concentrated in cities.

There are three alternative ways of overcoming the high cost of high-quality rural education: the first, represented by the non-formal education movement, is to give students in rural areas a different, and lower cost, education. The second is to provide formal schooling in rural areas with less-trained teachers but to use simple instructional technology, such as radio and cassettes, to maintain the quality of education. The third is to spread high-cost formal schooling in rural areas but to attach to that schooling agricultural units worked by students whose production pays the current costs of operating the schools (as in Cuba and Panama).

Most suggestions for financing education in rural areas fall into one of these categories or a combination of them. In the final chapter of this study, we shall examine the implications of our results for financial alternatives. These alternatives will depend in part on the value of education in rural areas and the level of education that seems to be valuable. They will also depend on the willingness of local populations to participate in financing their own and their children's education and the type of education they are willing to invest in. Finally, they will depend on the willingness of governments to mobilize local rural populations to provide schooling and other services in rural areas.

4. Theories of development and the role of education

Any analysis of the contribution of education to rural development depends on a theory of development itself. A theory of development defines the nature of change. It therefore defines the relationship of individual attributes of labor (such as education) to change. This notion is little understood: authors will argue, for example, that education raises productivity in rural areas (which it may or may not), and assume that such rises in productivity will be translated into higher standards of living for poor farmers or day laborers (jornaleros). Others hold that, since the cause of low incomes in rural areas is low levels of schooling in the labor force, one of the principal ways of reducing rural poverty is to increase education per worker. Such assertions presuppose a theory of development; a politico-economic theory of the relationship of the individual to his environment.

The three principal development models (the neo-classical, the dual and the Marxist) do not produce different policy recommendations as regards the relation of education to development. All three, for example, end up arguing for more education in rural areas. But the reasons for this policy are different and therefore the way the policy would be applied would vary accordingly.

a. The neo-classical model assumes that investment in education in rural areas yields high returns, especially when it is combined with investments in new seeds and other inputs of physical capital. The State does not invest in rural areas because such investment is irrational or because the State—for political reasons inherent in government bureaucracies—interferes in the optimal allocation of resources in the free markets. Thus, in this model, the State perceives itself as acting in an "anti-capitalist" or "anti-free market" way, and the aim of the policy should be to correct that inefficient allocation of resources between urban and rural areas.

b. According to the dual model, the role of education is to reduce the barriers that exist between the "traditional" and the "modern" sectors of the economy, to help integrate the rural sector that is separated by the culture or technology of the dynamic urban sector, and to bridge the gap between the two sectors.

c. The Marxist model argues that—contrary to the two foregoing models—low levels of education are not the result of the inefficiency of the State or cultural or technological barriers between urban industry and rural agriculture; its starting point is the exploitation of the peasants and rural workers by national and international capital. Accordingly, the present structure of investment in education already integrates the rural and urban sectors but on very favorable terms for the peasants and landless workers.

Interestingly enough, all three models would probably end up arguing for more education in rural areas: the first two, to bridge the gap and increase rural productivity, and the third, to increase the contradictions in capitalist development that might be fostered by sharply increasing the average level of schooling in rural areas. However, while the first two models might well argue for non-formal education, both on the grounds of lower cost relative to returns (higher rates of return) and of the specific skills and value changes imparted by such specialized training, the Marxist model would probably push for increased formal schooling only, since cheap non-formal education would tend to be much less likely to exacerbate contradictions and much more likely to have a disequalizing effect on rural and urban workers.

B. EDUCATION AND AGRICULTURAL PRODUCTIVITY

Since the pioneering work of economists like Denison, Becker and Schultz (19, 5 and 46) in the 1960's, we have become accustomed to thinking of education as playing a major role in economic growth. Human capital, their major conceptual innovation, was viewed as the accumulation of knowledge and information embodied in individuals that would enable them to produce with greater efficiency by using modern productive methods and tools. The work of the human capital theorists has shown that a considerable proportion of the economic growth evidenced over the past fifty years can be attributed to investment in human capital. Education, in its various manifestations, is generally viewed as the major agency for the development and distribution of human capital and it is principally in the schools where we witness the process of human capital formation, or the development of human resources. These theoretical contributions and the subsequent research they generated have played a considerable role in the emphasis on education as a major impetus (if not cause) of development and the ensuing policy practices of governments and international organizations.

Much of the empirical work done in this area, and therefore, the derived policies, have been centered on the urban sectors of society and production. Empirical studies on the rates of return on education have focused on workers in the urban workplace (see, for example, Psacharopoulos, 42). There are, however, persistent claims that education is essential to efforts to increase productivity in the agricultural sector, especially in the context of modernization and broad participation (Mellor, 37, p. 74). As in the industrial sector, education in the agricultural sector is viewed as producing skills and attitudes essential for a modernized agricultural productive system requiring the active participation of a broad spectrum of the rural population (Ashby, *et al.*, 2). The question therefore becomes one of determining the separate contribution of education to increases in agricultural productivity. There is already a modest literature on the subject and we shall review and discuss it below.

In a study that reviews the body of this literature without regard to geographical region, Lockheed, Jamison and Lau (33) postulate three hypotheses:

1. higher levels of formal education increase farmers' efficiency;
2. education has a higher payoff for farmers in a changing, modernizing environment than in a static, traditional one; and
3. exposure to extension services improves farmers' productivity.

Their paper is limited to reviewing only agricultural production studies in which the dependent measure was a crop and where a percentage gain in production per year of education could be computed. In general, their hypotheses are confirmed. Formal education is positively related to farmer efficiency, particularly under modernizing conditions (i.e., the effects of education are substantially greater in a context of modernization than under traditional conditions of production). The third hypothesis is more or less confirmed (i.e., the statistical confirmation is weak) by their results. They conclude that formal education and non-formal education (e.g., extension training) complement rather than replace one another.[4] This finding is of particular interest as it indicates that the effectiveness of education can be a function of the social environment in which it is set. They find that "over all studies, the mean increase in output for four years of education under traditional (social) conditions was 2.7% compared with 7.3% under modern or modernizing conditions" (37, p. 25).

Schultz (47) points out that one major problem in agriculture is that of allocative efficiency, which is the process of allocating existing land, structures, equipment, and farm people more efficiently. In an often cited article on the subject of allocative efficiency, Finnis Welch states that:

> If educated persons are more adept at critically evaluating new and reported improved input varieties, if they can distinguish more quickly between the systematic and random elements of productivity responses, then *in a dynamical context* educated persons will be more productive. Furthermore, the *extent* of the productivity differentials between skill levels will be directly related to the rate of flow of new inputs into agriculture. (50, p. 47; first italics added.)

He suggests that there are three potential effects of education on agricultural productivity: the improvement of the workers' skills, which makes them more productive directly; the improvement of managerial ability, which fosters the purchase of those inputs associated with efficient, least-cost technologies; and, the improvement of managerial abilities, which leads to an increased efficiency in organizing inputs and combining them at least cost. The first component is called the worker effect and the other two, the allocative effect. Again, we note that the allocative effect of education is perceived as being operative in a "dynamical context," or a social environment that is modernizing. From this viewpoint, education is seen as producing cognitive skills, communicative abilities, and attitudes that are likely to lead farmers to better allocate their available resources.

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[4] It is not clear whether they mean that the complementarity between formal and non-formal education is operative in an individual or collective context.

It should be noted that other factors may explain agricultural productivity and efficiency. The political power and influence of farm owners may play a large role in determining such government and credit-related inputs as water (irrigation), fertilizer and seed. Rice (41) reports that extension programs often use the strategy of working through the so-called progressive, leading farmers, who are often well connected politically. This suggests that "utilization of an efficient combination of inputs may depend as much on the farmer's command of resources, including political power, which structures access to inputs, as on the ability to choose correctly between alternative inputs and combinations of inputs." (Ashby *et al.*, 2, p. 12).

Patrick and Kehrberg studied the impact of education on agricultural output in five areas of Brazil representing "a wide range of agricultural conditions and levels of agricultural environment" (41, p. 147). In the five areas they studied, methods of farming could be considered traditional in two (Conceical de Castelo and Paracatu), relatively modern in one (Resende) and transitional in two (Vicosa and Alto Sao Francisco), areas in that many farmers practiced pasture improvement and crop diversification although the area is generally traditional. They make regression estimates on two dependent variables: the value added of schooling in terms of farm production, which is a function of the years of schooling of the farmer, frequency of direct contact of the farmer with extension agents, and a measure of fixed capital such as labor, land, livestock and equipment; and the choice of the "right" quantity of farm-supplied resources (allocative efficiency), which is a function of years of schooling and contact with extension agents of the farm operator. In the value-added function, they find that schooling was not statistically significant in the modern and traditional areas but did have a positive and significant coefficient in one of the transitional areas (Vicosa). Extension education is significant in only one of the traditional areas (C. de Castelo). In the equation estimating the effects of education on the allocative efficiency of the farm operators, they find that education has an appreciable influence on the choice of inputs in that the coefficients for schooling were positive and significant in all the areas but one (C. de Castelo). These results, then, also suggest that *education probably has its greatest impact on agricultural productivity in modernizing rather than in traditional areas.* The authors conclude that schooling returns increased as the level of modernization increased. In any case, we see from these results that the effect of education on productivity is not uniformly positive and is closely related to the social and economic environments.

Another Brazilian study conducted by Pachico and Ashby (reported in Lockheed *et al.*, 33) examines the effect of education on the value of farm production in four areas, two of which are classified as modernizing environments (Garibaldi and Taquari) and two of which are not (Candalaria and Guarani). The effect of education on agricultural productivity is significant only in the two modernizing environments, where there is an estimated increase in output for each additional year of education of 3.4% for Garibaldi and 4.06% for Taquari. Again we see that the relationship between educational experiences provided to a population and the desired effects in terms of agricultural productivity appears to be closely linked to the structural conditions of the surrounding environment.

Haller (28) conducted a study in four areas of Colombia in which he estimates the contribution of education to farmer earnings. Two of the areas he studied were classified by Lockheed *et al*. as modernizing environments (Chinchina and Espinal) and two were not (Malaga and Moniquira). Education (the average years of schooling by farm family members over 14) is significantly related to the dependent variable in only one area (Espinal), where it is estimated that farm output is increased by 0.378% for each additional year of education (33, p. 16). Nonetheless, Haller reports that schooling was associated (but not always significantly) with higher family income in all but one of the regions. However, the cause of the higher incomes appeared to be associated with the high number of decision options available. No worker effect was indicated as being associated with increased agricultural productivity. Rather, the impact of education was attributed to allocative effects. Haller concludes by questioning the value of schooling as a means of fostering rural development and suggests that investments in schooling are effective only when coupled with investments in other areas that would open up decision alternatives for the allocation of resources.

The studies reviewed above define education as formal schooling with educational variables measuring years of schooling attained by the individuals interviewed. The schooling being evaluated is primary and, sometimes, secondary level schooling. However, there are other areas of human capital investment that are pertinent to the question of agricultural productivity, namely investment in research and extension programs. The assumption is that research and extension are productive activities and that they contribute to allocative efficiency in the utilization of scarce resources that can be converted to agricultural products. Research is important in developing new seeds and better methods of production and utilization of land as well as in adapting agricultural technologies developed elsewhere (especially in North America) to local conditions and exigencies. Extension education is essentially the dissemination of information that is often the product of research. The transfer of technology and technological methods to the farmer also falls under extension work.

In an attempt to evaluate the economic contribution of agricultural research, Boyce and Evenson summarized the findings of "several studies that related observed productivity gains in production of a particular commodity to the research expenditures that produced them" (10, p. 103). These are rate-of-return studies and tend to "support the policy proposition that too little investment in agricultural research is being undertaken" (10, p. 104). Generally, the estimated internal rates of return are well above those from more conventional investment: measured returns of 90% for wheat research in Mexico, 35% for maize research in Mexico, 77% for cotton research in Brazil, and from 35 to 55% for maize research in Peru are typical (10, Table on p. 104). It is, however, important to note that the returns on research are not immediate. Boyce and Evenson point out that the minimum time for research to bear fruitful returns is three years, a ten to twenty year period (or more) being a more likely time frame in which one could expect to realize the benefits of research efforts in agriculture.

There are very few studies on the economic value of extension activities because of the difficulties in taking into account the richness of the extension experience for empirical determination of its contribution to production (10, pp. 106–108). Extension systems are essentially viewed as information agencies working in close articulation with the introduction of technology and the decision processes of the potential users. Indeed, without the introduction of new technology into the productive processes, there would be minimal return to extension activities. It appears, therefore, that the major arena for benefits from extension activities is that of improving the allocative efficiency of the farmers.

Although the studies reviewed above do indicate some relationship between schooling and agricultural productivity, the relationship is rarely a strong one and is highly inconsistent from one estimate to another. What does appear to be coming out of these studies is a general picture of a strong and intimate interaction between the social and economic environments, and the impact of education on increasing agricultural productivity. In general, we find that education is most effective in contexts referred to as modern or modernizing. According to Lockheed *et al.*, a modernizing environment includes "utilization of new crop varieties, innovative planting methods, erosion control, use of capital inputs such as insecticides, fertilizers, tractors or machines" (33, p. 14) plus a market oriented production and responsiveness to changing market conditions are exposure to extension services. It is interesting to note that Lockheed *et al.* find the interaction between education and environment to hold for most of the studies they reviewed, regardless of geographical location. This relationship held for all the Latin American studies they reviewed. We see therefore that any developmental strategy using education as an element must also be concerned with this interaction, otherwise the investment in education will most likely be ill placed.

C. RURAL EDUCATION PROGRAMS: INCOME EFFECTS. THREE CASE STUDIES

The literature on development contains two major streams of conceptual thought concerning the factors promoting economic and social development. One of these streams—probably wider because of its longer tradition in the academic, particularly economic literature—is that which attributes development to the structural characteristics of the economy and society. These characteristics are reviewed in the second part of this paper and include land tenure patterns, the nature of relations between owners and employees, the nature of the price system and the ways it is controlled and determined, the nature of the state, etc. The intellectual origins of the other stream are more recent and are to be found especially in sources developed in the fields of sociology and psychology. This second stream dwells upon the individual and how characteristics of individuals contribute to, and may be a cause of, development. The individual characteristics of particular importance to the subject of development are individual attitudes and values deemed relevant to social and economic change as well as knowledge possessed by individuals and pertinent to the application and development of new and advanced forms and methods of production. The process by which these individual characteristics are formed is of particular importance to us because of the central role education is presumed to play in the learning and inculcating of values, attitudes and knowledge (for a concise treatise on how this occurs, see Dreeben, 20).

The scholarly work on the importance of individual variables in development is best presented by the works of the psychologist McClelland and the sociologist Inkeles (36 and 30). The first introduced us to the "importance" for the acceleration of development of a need to achieve and a desire to be entrepreneurial. He argued that development is dependent on the existence of entrepreneurial-minded individuals, driven by a need to achieve, who will serve as motors of development. He claims that any society, modern or ancient, that made major developmental advances was particularly well endowed with a supply of need achievement in its population. He has made attempts to measure it and was surprisingly successful in demonstrating the relationship between need achievement (in a culture) and subsequent development. Furthermore, he shows that this syndrome can be inculcated into individuals. This suggests that by concerted efforts—aimed at individuals—the necessary seeds of development can be sown. His results suggest a role for education, particularly some form of non-formal education, in encouraging and promoting development by developing the level of need achievement in a population.

In their major work on individual modernity, Inkeles and Smith (30) study the attitudinal traits of the "modern man," which they present as a prerequisite for the overall modernization of society and therefore for increased levels of productivity. They conceptualize the syndrome of individual modernity in the following terms: "openness to new experience"; "readiness for social change"; "a disposition to form or hold opinions on a large number of issues" accompanied with an "awareness of the diversity of attitude and opinion" in the surrounding environment; an interest in acquiring new information; an orientation toward the present or the future rather than the past; a sense of personal efficacy; an interest and ability in planning ahead; a sense that the world is calculable and that people and institutions can be relied upon; a "valuing of technical skill and the acceptance of it as a valid base for distributing rewards"; a strong sense of occupational and educational aspirations; and an understanding of the basic logic underlying the types of decisions necessary to modern production (30, pp. 18-24). Although Inkeles and Smith were mainly interested in the relatively urbanized industrial worker, they consider this modern syndrome to be essential to the modernization of any sector of society, including the rural areas. Of interest to us is their finding that education makes the greatest contribution to the modernity of individuals compared with any other experience such as city living, working in factories, and the mass media. They find that the longer individuals are in (formal) school, the higher are their modernity scores and that the particular nature of the schooling experience is most likely to have a profound impact on an individual's sense of modernity and, presumably, his ability to adapt to more modern forms of production. They also find that individuals in the urban areas generally have higher modernity scores than their compatriots in rural areas. One notable exception to this—and of particular interest to us—is their finding that workers in agricultural cooperatives (in Bangladesh and Israel) have modernity scores at least as high as their urban compatriots (30, pp. 192-208). These findings suggest that the levels of attitudinal modernity of individuals—and, therefore, their predisposition to adapt to modern forms of production—are closely related to the forms of social organization in which they work. More specifically, this suggests that rural productivity may be profoundly affected by the way work is organized (e.g., into cooperatives rather than large landholdings), assuming there is a relationship between productivity and modernity.

These two streams of development thought—structural causes and causes relating to the individual—should not be taken as being in contradiction to one another. Rather, they should be viewed as complements, or parallel streams that may eventually be confluent. In the world of policy planning, however, there does seem to be a tendency to view the two streams as being in opposition. Much of the investment in education (for development) is justified in terms of human resource development, which is often accomplished in the absence of other forms of investments and structural changes. Justification for the massive amounts invested in education in Third World countries is made in terms of the importance for development of the individual and therefore of the agencies (especially schools) that train, educate, and develop the individual. Obviously, it cannot be denied that the individual plays the central role in the processes of development. However, the issue becomes one of determining the factors that push individuals to act as agents and instigators of development. Is it the particular training experiences the individual receives or, rather, aspects of the social structure in which the individual lives that motivate and encourage him to be more productive, innovative, and development oriented?

This question is of great importance for policy decisions concerning the investment of scarce resources and energy for development. Since the introduction of the human capital model, along with the identification of schools by the human capital theorists as the major institution for the production of this form of capital, we have witnessed the investment of enormous sums in various forms of education. Very often this strategy has been encouraged by international agencies concerned with development. One consequence was the creation of numerous educational opportunities in many developing countries during the 1960's and a large increase in the school population. This led to the production of large numbers of relatively well-educated youths who had difficulty in finding work, accompanied by a declining rate of return on increasingly higher levels of education (12). Furthermore, in some countries the rising aspirations of the newly educated became socially disruptive in the context of limited job possibilities and, especially, the limited ability of the rural areas to absorb these school leavers into their economies. In addition, the recurring costs of schooling became a burden on national budgets and made it increasingly difficult to divert funds into other areas of investment and resource development. We therefore see that the decision to divert large sums of national investment capital into educational endeavors is pregnant with consequences whose impact on development is not necessarily straightforward. This is not to deny the obvious need for, and benefits from, education. Rather, recent experiences suggest that the implications of a development strategy centered around the development of "human resources" at the expense of structural changes (investments and reforms) are at variance with the expectations of the original recommendations for investment in education a decade or so ago.

In attempting to arrive at well informed policy strategies for development—

rural or otherwise—it becomes imperative to sort things out and arrive at an understanding of the role education can play in augmenting developmental prospects in a balanced perspective. Empirically this is not an easy task: whereas we do have estimates (of dubious value) of rates of return on educational investments, there is precious little research that attempts to compare the effectiveness of investment in education with that in other spheres of the society, let alone the effectiveness of structural reforms. In the following pages we shall attempt to look at these issues by presenting data from three Latin American countries: Honduras, Colombia and Cuba. Without pretending to provide unambiguous and direct answers to the questions discussed above, we do intend to use the data and our analyses and interpretations to further illuminate the issue.

As a rule, it is extremely difficult to obtain direct measures of productivity, regardless of the economic sector. Studies on rates of return on education that use indicators of productivity usually take individual income as the best available indicator of marginal productivity. Although income is not a highly satisfactory indicator of productivity—there being all sorts of non-productive factors that influence wages—we are often at a loss to use other measures. In the following paragraphs we present data from Honduras, Colombia and Cuba that address the question of productivity and the factors, educational and other, that influence it. We shall attempt to furnish answers to the foregoing questions from the data presented below—answers that will be indicative rather than definitive.

1. Honduras

The analyzed data from the study of the impact of education in Honduras are presented in Tables IX-4, IX-5 and IX-6: Table IX-4 presents the means and standard deviations for the more important variables used, and Tables IX-5 and IX-6 present regression estimates for income and educational level of the subjects surveyed. The sample is based on a representative selection of individuals with at least six years of schooling (which limits the variation in the schooling variable) at present working in the agricultural and bananero sectors of the Honduras economy. In order to obtain some idea of the impact of structural conditions on income and educational level, we have separated the analysis by economic sector. In the agricultural sector we have included small to medium-sized farms and agricultural cooperatives. The bananero sector comprises those large, foreign-owned banana plantations whose workers are employees.

From Table IX-4 we see that, compared with the agricultural sector, those working in the bananero sector are much better paid, are somewhat better educated, are about five years older, are much more likely to have attended a private school (generally a company school), and are generally from higher socio-economic status families.

Our estimates of income in Table IX-5 indicate that the significant variables are education, job experience, and socio-economic status, sex and geographical location being significant only in the agricultural sector. A particularly striking difference between the two sectors is the differential importance of socio-economic status (SES) in determining income. In the agricultural sector it is advantageous to be from a high SES family (which brings no advantage in the bananero sector), but we find a strong negative effect of being of medium-level SES background, whereas this variable has a positive effect in the bananero sector. This suggests that, other factors being equal, individuals from middle SES families in the agricultural sector do not become relatively successful farmers, whereas their higher SES colleagues do. One possible reason for this would be that the most motivated individuals from this group do not remain in the agricultural sector in productive capacities but, rather, leave for other productive fields, most likely urban. If these middle SES individuals are to succeed in agriculture, they should be in competition with those from the higher SES group, who exercise considerable control over the structural aspects of rural productive life such as access to credit, ownership of the best land, and political and market contacts. It therefore becomes reasonable and more profitable for them to seek out the opportunities available in the cities. We do not find this pattern in the bananero sector, where there is no significant relationship between higher SES and income, and there is a significantly positive one for the middle SES group. This may be due to the particular organizational structure of this sector: the firms are extremely large, foreign owned, and hierarchically structured, with a large mass of uneducated laborers working under the orders of those with some education (those in our sample). All the individuals in this sector are employees and are therefore not in competition with others (who are better connected and more influential) for productive resources such as credit. Basically, the employment structure in the bananero sector is rather similar to that of large urban firms, whereas in the agricultural sector motivation and entrepreneurial skills play a larger role in determining success.

In this context, it is interesting to note (from Table IX-6) that both SES categories are significant and positive in relation to level of educational attainment; this is particularly so for the medium-level SES group in the agricultural sector. Therefore, we see a pattern where the fact of being from a middle-level SES group is highly positively related to educational attainment for individuals in the agricultural sector and, at the same time, negatively related to earnings in the same sector. This is an example of rural "braindrain," whereby the education of rural people does not appear to be related to productivity in these areas.

The importance of education for income appears most significantly in the bananero sector, where higher educational levels are significantly and positively related to earnings. In the agricultural sector, only the completion of secondary education appears to have an impact on earnings, there being no cases in most of the higher educational levels. This suggests that the utilization of educated manpower in the bananero sector is similar to that in urban-based industries: labor with higher levels of education is employed at higher salaries. We also see that, in both sectors, only higher levels of educational attainment increase income more than completion of primary school: for the agricultural sector, levels of education below completion of "educación diversificada" are not significantly different from completion of primary school in terms of present income; for the bananero sector the threshold is at the "educación superior" level. These results are surprising, in that it is generally thought that the first cycles of secondary education should have an impact on a worker's productivity and adaptability to modern productive methods. The results suggest that only the higher rungs of the post-primary educational ladder make a significant difference to an individual's income. Lower levels of secondary education appear ineffective for individuals who remain in rural areas if they are not allowed to complete it or continue to higher levels.

This suggests either that the content and the structure of secondary education are poorly adapted to the conditions of rural life in Honduras and are oriented more toward academic titles and diplomas and their prestige than toward learning about the concrete conditions of rural life and production, or simply that these years of secondary schooling are not rewarded by higher income in agricultural activities. Unless it provides access to supervisory positions on large farms or in the bananero sector, secondary education may not result in higher incomes. If confirmed elsewhere, this has serious implications for planners and policy makers. We know that there are many drop-outs in the early years of secondary school and that large sums are spent on providing secondary education for those who will not finish it, let alone continue beyond. If this investment proves to provide little or no advantage in terms of income in rural areas, we may have to think of alternatives, unless it is agreed that the main function of secondary education is to provide workers for the urban sectors. Such alternatives would be either in the content and form of the education provided, or in the organization of rural production and, therefore, in the linkage between education, income, and work. That only those with the highest levels of education (educación diversificada and higher) were significantly higher paid than those with only primary schooling, indicates that the reward structure in rural areas is probably not highly related to increased productivity, or that more education, except at the highest levels, does not afford an opportunity of being more productive. Those with higher educational levels may already be classified among a certain elite with access to supervisory or specialized positions in the agricultural sector. If the lower levels of education are to be effective, the structure and organization of production must be responsive to the felt needs of the producers, and this will only happen through changes in the structures of the rural productive institutions. In general, our results indicate the probability that the educational system in Honduras has to be strongly adapted to the needs of the rural production, at least outside the bananero sector.

2. Colombia

The data presented here are from a 1973 census sample of 51,000 individuals from 865 towns. The individuals are involved in agrarian activities and range from 15 to 99 years of age (see Table IX-7). In our regression equations presented in Tables IX-8 and IX-11 we shall be looking at the factors that contribute to four dependent variables: the number of secondary schools, the literacy of the individuals, the number of years of schooling of the members of our sample, and the logarithm of their present income.

Our independent variables are the following:

a. A set of four dichotomous variables each of which indicates a level of development of the towns. The four stages are: rural backward, indicating towns with a predominantly agricultural economy and very few public utilities and/or roads; rural, indicating towns with an economy based on agriculture, some public services and roads, and an inchoate commercial sector; semi-rural, indicating towns with a mixed agricultural and commercial economy, most public services, and roads; urban and/or semi-urban, indicating communities that have an agricultural sector but also some other predominant economic sector, have complete public services and are of administrative importance (this is the left-out variable in the set).

b. A set of four dichotomous variables to indicate the topographical characteristics of each town. This is of particular importance in Colombia because of the variety of topographies and their influence on agricultural activities. There is one dichotomous variable for each of the following topographical settings: high altitude; medium altitude, including coffee producers; low and sea level regions; and mixed altitude for towns whose territory has different types of altitudes in more or less equal proportions (this is the left-out variable in the set).

c. A set of three continuous variables relating to the land tenure patterns for each town. The data for these variables were gathered from the 1970-71 Agrarian Census. The variables are the number of farms per rural household, the average size of farms in the municipality, and the average size of farms under sharecropping (as opposed to owner and renter) tenure. In addition, there are several other independent variables including the age of the subjects, their number of years of schooling, and the percentage of rural population in the towns (or, rather, extended municipalities) in our sample.

Table IX-8 presents our estimate for the factors determining the number of secondary schools in a region as a function of the level of development, the average size of the farms in the municipality, the average size of farms under sharecropping, and the percentage of rural population in the municipality. The estimate is significant, 48.6% of the variation being explained by the independent variables. We find that the average size of the farms under sharecropping or in the town is not significant, which suggests that the relationship between large landholding and the type of political influence that would bring more schools to an area is much less than expected. Most importantly, we see that the availaability of schools changes strongly with the level of development. We see that all three of the rural variables, in comparison with the left-out urban variable, are negatively related to the availability of schooling. This disadvantage of rurality with respect to schooling is further confirmed by the negative coefficient associated with the percentage of rural population. Thus, we see that a sizable proportion of the variation in the availability of secondary schooling is explained by the degree of rurality of the municipalities studied, the other variables not even being significant. This is not surprising since we are accustomed to finding higher levels of schooling in the relatively urbanized regions—an example of the urban orientation toward schooling.

Table IX-9 presents the regression estimate for a dichotomous variable indicating the literacy of the subjects in our sample (1 = literate); the estimates are presented for the population as a whole and within each age-group. All the estimates are significant, but they explain a rather small part of the variation in the dependent variable. The most consistently significant variables are the development and topography variables, the others making only two significant (but weak) appearances. Basically, this result suggests that the degree of urbanism and the productive capacities of an area are the factors most importantly related to the literacy rate of a region. However, it must be noted that we could explain no more than 4% of the variation in the dependent variable, which suggests that there are other factors that have an important impact on literacy—factors we have not included in our model.

Table IX-10 presents the regression estimate for the amount of schooling of the subjects in our sample, the estimates being presented for the sample as a whole and within each age-group. All the estimates are significant, no more than 1.1% of the variation being explained by the equation. The low percentage of variation explained means that the independent variables we have used (those available to us from the census data) are far from having any predictive value for this dependent variable. The variables that are significant are those in some way related to the general wealth (or the productive capacities and the degree of urbanism) of the area in which the individual lives. This is not surprising, given the results of Table IX-8. In view of the lack of data on individual characteristics such as parental socio-economic class, parental educational level, etc. (such as we have for Honduras) it is to be expected that we have not succeeded in explaining much of the variation in the dependent variable. However, we do note that the independent variables that have the greatest impact on schooling are those that are related to the general wealth of a region: this suggests that these variables have an impact on indicators of individual wealth which, as a myriad of studies have shown, has a great impact on individual schooling experiences. One example of this from Table IX-10 would be the increasing size of the coefficients for the development variable (as they go from rural backward to semi-rural) in the estimates for the total sample.

Table IX-11 presents our regression estimate for income. It is to be noted that about a quarter of our subjects reported no income and are excluded from the estimate. One explanation for this would be that the census was conducted before a harvest, which would have deferred income until a later period. In spite of reporting zero income, 96.4% of those interviewed reported having worked. Furthermore, 22% are independent workers who could be considered subsistence farmers and therefore would have no income. Another factor is that 28.6% of our sample were family workers without pay. In any case, 38.3% of the zero-income cases reported that they were wage earners. Because of this problem there was relatively little variation in the dependent variable (income). A major problem in gathering data on income is the distinction between income in kind and income in wages plus the seasonal variations (the question asked for the subjects' income for the previous month). Because of this, we are not able to explain more than 18.1% of the variation in income in our estimates, although all of them are highly significant.

We find that education is only marginally significant for the lowest age group and significant for all other groups. Of greatest importance here is the finding that, for the 15-20 year and the 21-27 year age groups, one or two years of education appear to be indistinguishable from no schooling, in terms of their respective contributions to income (there is a similar tendency for the 28-35 year group). This suggests that, for those age groups at least, the pay-off on schooling occurs only after a threshold of minimal schooling (3 years) has been achieved. This reminds us of the phenomenon of functional illiteracy among people with only one or two years of primary schooling. We see, of course, that it is the highest level of schooling (more than 5 years, or post-primary) that has the greatest impact on income. From a perspective of present policy, it is the younger age groups that are most pertinent and the results suggest a certain futility of an investment in schooling that allows pupils to drop out after only two years or so. Poor topographical conditions have a rather strong negative impact on income; this may reflect the extent of bartering in the high-altitude areas, which diminishes the monetary income of the people in these regions. The number of farms per rural household and the percentage of rural population in the town also contribute negatively to income. This means that individual income is inversely related to the number of people living in the countryside—i.e., the more rural, the poorer. We also see an inverse relationship between income and the number of farms per rural household. This is because these farms are relatively low-income minifundios and semi-subsistence farms that have grouped together out of economic necessity and report low monetary income. Therefore, if we accept the neo-classical assumption of income as an indicator of productivity, we see that structural factors such as topography, level of development, and tenure patterns may be as important as education in determining agricultural productivity in Colombia.

3. Cuba

In 1958, Cuba faced many of the same economic and educational problems as Colombia and Honduras in 1978: the economy did well during sugar booms in the forties and fifties, but otherwise, the gross national product (GNP) stagnated. In 1957-58, *per capita* income was essentially the same as in 1951-52, and in 1951-52, it was essentially the same as in 1948, although it fluctuated greatly between those dates (6). Cuba—it is true—was an extreme case of this kind of development: extremely closely tied to the United States, extremely dependent on one crop, but correspondingly relatively rich because it could produce that crop at relatively low cost and because of its preferred position in United States markets, its large sugar crops, nickel supplies, and—in the 1950's—tourism and gambling.

As in Honduras and Colombia, conditions in Cuban rural areas in 1950 were much worse than in urban areas. Fewer children were in school (there were fewer schools), the drop-out rate was higher, teachers poorly prepared, incomes lower, and many people were isolated from the mainstream of economic activity. But Cuba also differed from most other Latin American countries. Because of the dominance of sugar in agriculture and the plantation cultivation of that crop, a typical rural laborer in pre-revolutionary Cuba was a wage-earner rather than a peon or subsistence farmer; in 1952, paid workers accounted for 63.6% of the total agricultural labor force. The thirst for land characteristic of the peasant was subordinate in the rural proletariat to demands for better living standards and working conditions, higher wages, job security, and better educational opportunities for children.

Land ownership was very unequal, 0.5% of the farm units occupying 36.1% of the total cultivated land in 1945 and 69.6% of the farm units occupying only 11.2% of cultivated land. The 28 largest sugar corporations controlled 86 mills occupying 18% of the cultivable land in 1959 (44, p. 48 and 3, pp. 84-85).

These conditions of inequality and dependent development were directly reflected in the Cuban educational system of that period. Despite the fact that 40% of the labor force and 50% of the population were in rural areas, only one-third of the primary enrollments in the 1950's was in rural areas. While this is typical of Honduras and Colombia today, Cuba also had its own peculiarity: there was educational stagnation in the 1930's, 1940's, and 1950's, which resulted in declining enrollment in primary school. In 1925-26, 63% of primary school age children were enrolled in school, while in 1955-56 the enrollment had fallen to 52%. By 1958-59 the fraction of the age group 5-14 years enrolled in primary school had declined to less than 50% (9, pp. 280-81). There was also enormous corruption in the Ministry of Education. The World Bank reported in 1950 that "the Ministry of Education [was] a principal focus of political patronage and of graft" (32, p. 177).

Nevertheless, the Cuban population in 1958 had a relatively high level of education and low level of illiteracy, still better than that of Honduras and Colombia in 1978: in 1958, about 75% of the Cuban population aged 10 years or more had completed some primary or higher education and only 25% had not attended any school. And over 1% of the population over 10 years old had attended university. Only 23.6% of the population was illiterate.

To some extent, Cuba in 1978 still has educational problems in rural areas similar to those in Colombia and Honduras: there is still a lower level of education in rural areas than in urban; the drop-out rate is higher; and teachers have a relatively lower level of schooling and preparation than in urban areas. For example, only 21.2% of the 1965-66 cohort graduated primary school in 1971; the rate was 34.2% for urban schools and only 11.7% for rural schools. At the junior high level, of the 59,000 students who entered the seventh grade in 1966-67, only 29% (or 17,000) reached the tenth grade and only 47% of those (or 8,000) passed that grade. These figures have improved greatly for more recent cohorts: for example, in 1966-67 there were 142,000 students in basic secondary school (grades 7-10); in 1974-75, there were 338,000 students at that level (14, Table 8). Graduation from primary school has increased correspondingly. According to UNESCO data, only 7% of primary pupils was in the sixth grade of primary schools in 1965 (compared with 31% in first grade), while 11% were in the sixth grade in 1974 (compared with only 19% in final grade). And as we shall learn, much of this increase in secondary education came from rural students.

Castro analyzed these problems of the educational system in a speech at the Second Congress of the Young Communist League on April 4, 1972:

> What factors cause these difficulties? There are quite a few. For example the material resources: school installations, the materials available for study, the difficulties involved in going to school in the mountains, the distance, the isolated school, the poor school, the school in a hut or the school with a roof of thatched palm. There are other problems: the environment, the cultural level of the population, a persisting lack of awareness about the importance of schooling and education, of the need for discipline, regular attendance in school and parental cooperation with the school. Another important aspect is the quality and efficiency of educational personnel in the schools. Out of the 79,968 teachers, only 24,265 have graduated from teacher training; in other words, 30.4 percent of the teachers have graduated. In the elementary schools, 61.3 percent of teachers are non-graduates and in the junior high schools, 73.7 percent are non-graduates.

But these are relative problems. When one considers the changes that have occurred in Cuban rural areas—particularly in Cuban rural education—between 1958 and 1978, the Cubans have gone a long way toward solving the kinds of difficulties in rural education faced by Honduras and Colombia (and most other Latin American countries). Even the problems of the educational system discussed by Castro in 1972 have been greatly reduced since, largely by a massive teacher education program and other measures we shall discuss further.

Before analyzing these changes, however, it is important to point out that we cannot do it in the same way as we have in Honduras and Colombia. The income functions we estimated for those two countries describe the relationship between education, wages, and social class in two countries where wages are supposed to reflect productivity. That does not mean that we think that they do so, but wage rates do tell us something about what the pay-off is on schooling in a particular sector of the economy, and may tell us something about the way a "society" values education in that sector. It may explain the interconnection between low investments by the State in rural education, the low private return on investment in schooling in rural areas, and the social class basis for giving and getting education in rural areas. Our studies have argued that, in economies where the economic structural conditions are such that additional education in rural areas—especially at the lower levels of schooling (primary and lower secondary), which are the limits of attainment of more than 95% of rural children—has low value, the possibilities for greatly expanded rural education, and, indeed, for rural development should be seriously questioned.

In Cuba, income data are not available on an individual basis, and certainly not in relation to individual socio-economic background and education in rural areas. The State in Cuba fixes salaries by occupation and sector, and we do have some information on those salaries. For example, from the scant salary and labor force data published by the National Planning Board (*Statistical Yearbook Compendium of the Republic of Cuba, 1974,* Tables 7, 10, 14, 60, and 61), we estimate that the average salary of a Cuban worker was 1,563 pesos in 1974 (this is not *per capita* income since it is per worker and does not include the sizable part of the national output that is not in salaries). The average salary in agriculture was 1,414 pesos. The size of the labor force (and hence, the average salary) is very approximate and may be wrong in absolute terms, but we estimate it in order to show that the difference between agricultural and non-agricultural salaries is small, despite lower average education of agricultural workers. MacEwan reports that:

> There is no thorough data available on the distribution of income or on the structure of wages and salaries in Cuba. My own efforts to gather data while visiting a variety of work-places in Cuba, however, revealed a rather consistent picture [1972]. A cement factory near Santiago seemed to be typical of the industrial sector. There the lowest salary rate was 100 pesos a month, the highest 300, and the average around 170. On a state farm in Pinar del Rio, I found the minimum salary to be 90 pesos a month, the top 250, and the average around 140 (34, p. 86).

He concludes that, for almost all Cubans, the salary range seems to run in a ratio of about 1 to 3.5.

In recent years, this might have changed somewhat because of material incentives—a bonus system where a worker's productivity can affect his or her income. But while those incomes fixed by the State are definitely correlated with education, material incentives are not necessarily tied to education: a highly productive agricultural worker at the low end of the pay scale could increase his income relative to an administrator. Even so, education and income should be highly related—including in agricultural work and in rural areas—but the relationship is not as great as in capitalist societies at the high end of the education scale. Thus we would expect to find in Cuba a much stronger relationship between education and income for agricultural workers than in Honduras and Colombia at lower end of the education scale; for example, for those with completed primary schooling versus those without. But the relationship should be much weaker for the differences between the highly educated and the middle level-educated simply because salaries for the highly educated are not very high.

However, as we have pointed out, the education/income relation misses the point both in Cuba and in other countries. That relationship only reflects the structure of education and income in the economy; it tells us something about the value placed by the society on education in the agricultural labor force. It also tells us about the nature of education and incomes policies in each of the societies with respect to rural areas. In Cuba it is clear that these policies have centered on equalizing urban and rural incomes and on equalizing incomes between those with little and those with more education. It is also clear from the data on educational expansion (as well as the expansion of other services) that Cuba has placed much more emphasis on investment in rural areas and in agriculture than either Honduras or Colombia. While there may have been great inefficiencies in the way Cuba went about this investment (many of them admitted by the Cubans themselves), there is little doubt that agricultural production in Cuba is much higher now than it was in 1958, with a much smaller percentage of the labor force (39), that everybody in rural areas goes to school, and that a rapidly increasing percentage attends secondary school and university. It is instructive to ask what measures Cuba took in education to achieve such high levels of enrollment in rural areas.

a. Since the first year it came to power (1959) the present Cuban government has spent a high percentage of GNP on education, and a high percentage of the educational budget on primary and lower secondary schooling. Much of this went to rural education.

> ... The Revolutionary Government in only twenty months has created 10,000 new schools; in such a brief period it has doubled the number of rural schools that had been created in fifty years. And Cuba is today the first country of America that has satisfied all the schooling needs, that has a teacher in every last corner of the mountains ... (Fidel Castro. Speech before the United Nations, September, 1960).

In 1965, Cuba's education budget was 289 million pesos—7% of GNP—which was already very high. For example, UNESCO set a target of 4% of GNP as a 1970 target for developing countries. Colombia doubled the percentage of GNP it spent on education from 1.7 to 3.4% between 1960 and 1969 (31, pp. 10-11). Even if we include the important contribution of private educational expenditures to the total in Colombia, it is doubtful that the total would represent much more than 4% of

GNP. Furthermore, there is very little private expenditure on rural primary schools.

In 1975, Cuba's education budget was 875 million pesos, or 12% of GNP. Nineteen per cent of the total Cuba population in 1974 was in primary school, and another 4% in lower secondary school. Almost 30% of the Cuban population was in school full or part-time in 1974 (including adult education) (Castro, 1976). Furthermore, Cuba spent 104 pesos (1 peso = $1.10) per student in primary school in 1973-74 compared with US$34.2 per primary student in Honduras in 1970, and US$16.3 per primary student in Colombia in 1973 (49). Thus, in large part, Cuba achieved educational expansion and lowered attrition through sheer force of spending a very high fraction of its economic output on education, much higher than either Colombia or Honduras.

It is important to add that Cuba raised this money by fixing wages lower than they might be in a market economy, especially the wages of the higher educated. Even with relatively low wages—such as the 350 pesos per month mentioned above for an administrator—Cubans for many years had nothing to spend these wages on (except in the black market). This is changing now as a number of "luxury" goods are becoming available at very high prices. In any case, low wages and lack of goods created forced saving of about 30% of GNP for many years. Much of this was and is invested in education and social services. The forced saving is—when compared with a market economy—especially large among the higher educated. This is in complete contrast to Colombia, where Jallade's careful study finds that, while there is a redistributive effect of education on income (from rich to poor), this effect comes about because of "the strong propensity of higher income groups in urban areas to enroll their children in fee-paying private schools . . . it appears that only the public financing of primary education has a strong and positive redistributive effect on income." (31, p. 69). But, he goes on to say, this redistributive effect takes place only at a point in time. If the Colombian education system redistributes income by having the rich enroll their children in private schools, in the long run this could make income distribution much more unequal since the rich would get "better" and more education than the poor. We shall return to this point in the next section, but let it just be said here that this was not the means used to equalize education and incomes in Cuba.

b. Largely for political reasons (for example, the lack of an organized revolutionary party apparatus ready to carry out the revolutionary program plus the external threat posed by the United States), the July 26th Movement had to rely on mass mobilization to carry out its political and economic reforms and continues to do so. Mass mobilization had many effects on the educational system; indeed, education became—as early as 1961—the cutting edge of the mobilization strategy. This was expressed in the massive and famous "literacy campaign" of 1961, in which all the schools in Cuba were closed for nine months and 250,000 teachers and students went into the far reaches of Cuban rural areas to teach one million illiterates how to read. In terms of literacy training, the effort was moderately successful: about 700 thousand of the million were taught to read (no one knows, however, for how long they retained this literacy). But in terms of making urban dwellers aware of conditions in the countryside and in terms of incorporating the most marginal of rural dwellers into the Revolutionary project and ideology, the program was apparently crucial to the Revolution's political success.

As soon as the literacy program was over, it was followed by an equally massive adult education program, in which adults were brought into primary schools near or next to their places of work and given at least some primary education. That program reached its height in the mid-sixties and then declined slowly until the present time (14, Table 6), when less than 200,000 people are enrolled (compared with 800,000 at its height). In its place, however, the worker-peasant faculties of the university were expanding rapidly from a few thousand students in the mid-sixties to almost 30,000 already in 1972. All these adult education programs had a particular impact on rural workers, who had the least education among Cuban labor in 1959. Again, the effectiveness of the worker-peasant schools on productivity may not have been very great, especially since we have information that worker productivity did not increase very much in the 1960's. Yet its socialization effect may have been important, especially since education is so highly regarded in Cuban society.

c. After the mid-sixties, Cuba faced a crucial shortage of highly skilled and highly educated labor because of the emigration of much of the professional elite to the United States. But just as important was the shortage of agricultural labor of all kinds, from the most skilled to the sugarcane cutters (who also had to have particular skills). Cuba placed primary emphasis on sugar production for export and the development of diversified agriculture for internal consumption after 1963-64. Policy also followed a full-employment strategy. Labor shortages in rural areas soon began to be felt. To fill these shortages, high school students began to go to the countryside in 1966 for 35 days a year. There they worked together in cadres. The idea had merit in that it tried to use student labor especially during sugar harvests. It also socialized students into the work process. But it detracted from their scholastic achievement, and they weren't very effective workers.

The most important effect of the experiment, however, was that it led to the development of a totally new concept of schooling by the end of the decade: the school in the countryside. This type of lower secondary school (7th to 10th grades), which was first started in 1969-70, had 500 students from rural and urban areas boarding in a rural school and producing agricultural output 20 hours per week as part and parcel of their training. The agricultural output of the schools is part of the agricultural plan; it appears that most of the schools produce enough to cover their current costs as well as to recover their construction costs in about 20 years. In 1974/75 there were 150 such schools and they accounted for 25% of all lower secondary students; by 1978/79, there should have been at least 400 schools, with 200,000 students (16).

> No longer will the school go to the countryside; there is now the school in the countryside. No longer will there be five weeks, six weeks, forty days, fifty days, in which students leave studies and do work in the countryside. No. We will systematically combine study and productive work daily. What does this permit us? It permits us to create an *economic base from this educational plan*. Because we understand that the production of these schools will cover the school's investment costs and expenditures. If this is so, then we *will be able to construct schools of this type without limit*. If this is so, we will be able to continue expanding and developing these plans. This type of school combines two factors: first, an ideal educational type of a socialist education, a

> communist education with the necessities of our own economic development. At the same time, this kind of school is not a drain on the economy but contributes to the economy and to the development of the country. Thus we can continue to construct this type of school until we have all our students in secondary schools of this type. Because of this, we consider that for the conditions of our country this is the ideal type of school (Fidel Castro, April 25, 1971, italics added).

> It is to be expected that, in the next decade, after 1980, the costs of education, all the costs of education, will be offset by the productive work of the students. There is no other formula for a country like ours that has to develop its economy in conditions of hard work, given that we don't have easy wealth among our natural resources to be able to sustain a universal education program (Fidel Castro, 1976).

d. Cubans extended this concept of work and schooling down to primary schools and up to including the university level. With the success of the first schools in the countryside, primary schools had gardens attached to them, and the children in primary school tend gardens a few hours per week. University students work in related work as part of their regular curriculum. In addition, at the university level, much more emphasis has been put on technical subjects and agriculture. In fact, the fastest growing program in the university is agriculture, which had 1,300 students in 1965 (6.3% of the total) and 104 graduates (5.8% of the total) and 7,400 students in 1974 (11% of the total) and 796 graduates in 1974 (13.6% of the total) (49, Tables 5.2 and 5.4).

e. The main bottleneck in the expansion program at both primary and secondary level was and continues to be lack of teachers. Cuba has put increasing effort into [illegible] teacher training program. It has long abandoned its rural teacher training efforts that required young people to train for two years in the mountains before beginning their more traditional teacher training. Fidel argued that this was a mistaken policy (for efficiency reasons) as early as 1973. He repeated this again in his speech to the First Communist Party Congress in December 1975. Cuban teacher training programs are now a combination of formal training in teacher education schools, inservice training programs to upgrade the large percentage of below-level teachers in primary and secondary schools, and the "guerillas of education" program that takes tenth grade graduates and starts them teaching seventh graders as they are taking formal teacher training on the side. This last measure is a temporary program designed to meet short-term education requirements due to the large expansion of secondary education. Boarding schools and decreasing pupil-teacher ratios are apparently keeping examination scores from falling (they are perhaps even rising) despite the lack of trained teachers (14).

In short, then, the Cuban experience shows that successful expansion of rural education can be achieved under certain conditions: in the Cuban case, this means a massive amount of resources devoted to primary and lower secondary education and particular efforts to help rural areas to catch up; an equally massive adult education program, whose primary purpose was to socialize adults into Revolutionary goals; a combination of work and study whose purpose is (a) to socialize youth into new values of the equality of manual and intellectual work and the importance of collective incentives, (b) to raise scholastic achievement through boarding the students at the school; (c) to bring urban youth into the countryside to help develop a larger agricultural labor force; and (d) to reduce the cost of secondary education by having students produce agricultural output as part of their educational experience. In addition, much greater emphasis was put on agricultural professions in the university, and Cubans began an extensive teacher training program to meet their educational needs.

Clearly, agricultural production and rural education was assigned top priority in Cuba as early as 1959, and with only minor changes in policy, that priority continues to this day. There is much to be learned from the Cuban experience in financing rural education and solving its problems. In Section E we shall discuss these and other aspects of such financing.

D. NON-FORMAL EDUCATION

In recent years, much attention has been focused in development education circles on the "promise" of non-formal education. Non-formal education is usually taken to mean anything that appears to be an alternative to formal schooling as we defined it in Section A of this paper. Examples of non-formal educational programs would be extension training, trade or vocational training centers, on-the-job training, community development programs, radio and television educational programs, literacy programs, etc. It is obvious that such educational programs represent nothing new in the world of learning; what is new is the use of the term "non-formal education" by development educators to cover the myriad of learning experiences that occur outside the context of formal, traditional schools, and to suggest that it represents a powerful force for social change and development. Indeed, it is hard not to draw a parallel between the claimed "potentialities" of non-formal education for development and the claims made a decade or so ago about the developmental benefits to be gained from massive investments in formal schooling. Although often lacking a precise definition, non-formal education may be described (at its best) as "a design process which considers the use of alternate resources combined in alternate ways depending on the setting, the goals of education, and the needs of the particular learners" (Evans, p. 306). In other words, just about anything outside the formal school may be considered non-formal education.

Probably the best known advocate of non-formal education for the needs of development is Philip Coombs, who views formal schooling as not able to meet the learning needs of the rural poor of the Third World. He thinks of non-formal education as a substitute for, or a complement to, formal schooling, which, with proper implementation, design and planning, could remedy the "educational deprivation" in the rural areas that hampers rural development and transformation (18). From this perspective, the educational needs for rural development are the following: general or basic education, which includes literacy, numeracy, an elementary understanding of science and one's environment; community improvement education designed to strengthen local and national institutions, and instruction in the working of government and cooperatives; and vocational education. The target subgroups for this instruction would be farmers, artisans, and entrepreneurs, and rural administrators and planners (18, p. 15). Some of the great advantages of non-formal education, according to Coombs, would be the decentralization of the planning and implementation of its activities, and the relative low costs of non-formal educational projects (17, pp. 288–9). Coombs and Ahmed have identified four approaches to developing non-formal education in rural areas: extension work; training, including vocational training centers and other training courses; cooperative self-help in the context of rural cooperatives; and the integrated development approach in which production and learning are combined into one experience for the interested individuals.

The major advantage claimed for non-formal education by its advocates is its flexibility in meeting the learning needs to be found in developmental situations. Programs can be oriented toward specific groups and problems, the time frames can always be arranged and rearranged according to perceived need, the educational technology (or technologies) used in the learning process can be varied, and there is no need for a large, and often unwieldy and overburdening, institutional structure. For example, Coombs and Ahmed (18, p. 17) show how the didactic content of non-formal educational programs can be designed for the particular needs of different rural occupational groups: for persons directly engaged in agriculture (farmers and farm workers) learning needs would include farm planning and management, information on the application of new inputs, knowledge of government services, civic skills, etc.; for those engaged in off-farm commercial activities (retailers and wholesalers, construction workers and artisans, financial people, etc.) learning activities would include management and technical skills and quality control; and for general services personnel (rural administrators, planners and technical experts), non-formal education could provide general, technical, and management and leadership skills for administrators and planners. In other words, non-formal education is not fettered by the usual institutional constraints of formal schooling and can be designed in the light of the particular learning needs at hand.

One of the major appeals of non-formal education is its ability to take advantage of various types of technology in meeting learning needs. Evans (21) outlines four categories of technology used in non-formal education: large-scale communications media, such as broadcast television and radio; small-scale communications media, such as film and video and audio tape; small-group instructional technology, which includes the usual panoply of methods used by teachers plus games, role playing, and simulations; and folk media, which include the use of traditional networks of information and communication and dramatic presentations such as the "Drama for Progress" theater in the Jamaican Literacy Campaign and "El Teatro Campesino" in the United States. It is just this variety of technologies available to the non-formal educator—a variety that can be used in various combinations—that has made this form of education so attractive in recent years to those interested in finding educational answers to specific problems.

Without using the term "non-formal education," Paulo Freire has probably become one of the most influential people in the world of non-formal education. In his well-known book, *The Pedagogy of the Oppressed* (25), Freire develops the concept of dialogical education in contradistinction to the usual didactic education dispensed in schools. This didactic education, he says, resembles the banking process whereby knowledge is deposited in the heads of pupils who are treated as mere passive receptacles by the educational process (teachers, administrators, curriculum developers, researchers, etc.). Freire decries this (usual) form of education and argues that it is antithetical to genuine development, which requires a high level of motivation of its actors—i.e., the individual peasants, farmers and workers, whose desires and abilities to work are the sine qua non of the developmental processes. If education is to be part of a development strategy, Freire would argue, the content and methods of education must be of directly perceived interest to the client population and must involve them actively in all aspects of the learning process. In a subsequent work, *Education for Critical Consciousness* (26), Freire argues that education must be an experience of liberation, where the pedagogical effort required is one of "conscientizacão." Discussing the subject of extension training—one of the major items in the panoply of non-formal education—Freire suggests that the task should be one of communication, which is dialogical in nature, rather than extension, which is basically propagandistic. Freire develops the argument that peasants and those likely to provide them with extension training are of two different cultural response sets. These differences must be recognized if peasants are to be expected to respond to the lessons and information of the extension agent. "Because the answers peasants give to natural challenges are cultural, they cannot be replaced by superimposing the equally cultural responses (ours) that we 'extend' to them" (26, p. 109).

The basic building block of Freire's pedagogy is his concept of "conscientizacão." According to his theories, true education, centered around the use of knowledge for the liberation of the learners, can occur only when the learners are motivated by their surrounding material conditions to learn to alter those very conditions. This is where we find the link between education (of the non-formal variety) and development: out of a desire to change their material conditions (which are perfectly characteristic of underdevelopment), rural dwellers would be motivated to learn only when they perceive that such learning is directly related to an increased comprehension of these conditions and can help them in directly changing these conditions for their benefit. Presumably, these changes go along with increased productivity. It is important to note, however, that Freire's pedagogy, and his own practice of it, is profoundly political. "Conscientizacão" implies education aimed at increasing the learners' understanding of their situation from political, social and economic perspectives. Freire reasons that it is only when this sort of understanding is attained that the concerned individuals will be able to conceive of solutions and be sufficiently motivated to act on them. And, as we pointed out in section A of this paper, the motivation of the individuals in the line of production is an essential element in any development strategy. This takes on even greater importance if education is to be considered part of such a strategy, since investments in human capital (education) will have minimal impact if the individuals concerned are not motivated to learn and apply their learning to the productive forces of the economy.

There is a myriad of non-formal educational programs and proposals that we will not review. It is important to note, however, that, as a rule, non-formal education is not presented as a substitute for formal schooling but, rather, as a complement to it that has the advantage of being highly adaptable to specific needs and relatively inexpensive. It is understandable, therefore, that non-formal education is viewed with such positive interest by development-minded planners and policy makers aware of limited resources and the dubious successes of formal education.

There are, however, other aspects of the use of non-formal education that have recently been discussed by Bock and Papagiannis who point out that "there are a number of myths concerning non-formal education (and schooling as well) that from a sociological perspective raise more questions than they answer" (7, p. 14). Essentially, they argue that non-formal programs such as vocational training "may be representative of the process of modernization rather than of development" (7, p. 14) in that they do nothing to change the distribution of power and wealth. Non-formal education is seen as keeping the separation between the primary occupations (white-collar, professional, and managerial) and the secondary occupations (agricultural and industrial workers) impermeable. Schooling is for those who aspire to the primary occupations and come from relatively advantaged socio-economic sectors while non-formal education would be reserved for those condemned to the lower rungs of the socio-economic ladder. Thus, the problem that appears to be often associated with non-formal education is that, instead of opening up the stratification of a society (in terms of the distribution of power and wealth), it may actually be contributing to greater stratification accompanied by greater rigidity between the social walls of the society. Leaving aside the issue of equitable distribution and justice, we can easily imagine how expectations generated by this form of educational activity can be thwarted and lead to politically volatile disillusionment. From this perspective, non-formal education may be viewed as taking on a "cooling-out" function in the educational experience of individuals (relatively low-cost training programs are furnished to those most likely to remain in secondary occupations) while, at the same time, the appearance of neglecting these individuals is avoided.

From the perspective of cost and returns, non-formal education is often proclaimed highly advantageous. There is, however, precious little hard information on the returns on non-formal education relative to those on formal schooling. Likewise, it is exceedingly difficult to develop a reasonable way of comparing the cost of the two forms of education. The most serious attempt to address these issues is that of Ahmed (1), who readily admits the limits involved. Rather than attempt detailed comparison between formal and non-formal education, he limits his investigation to a discussion of costs and financing. From this perspective, he finds that the major advantages of non-formal education lie in its adaptability and flexibility in the institutional, pedagogical, and social contexts. He points out that non-formal education is particularly flexible in terms of fixed costs because of its ability to utilize personnel and space already allocated to other projects. Non-formal education programs often do not require long-term commitments to either physical space or personnel. Furthermore, it has various ways of securing financing: household funds (tuition fees), voluntary funds, funds from the economic enterprises of the programs, as well as state financing. Because of the decentralized nature of many non-formal educational programs, the probability of their receiving local financing is increased.

In lieu of developing a cost-effectiveness analysis of non-formal education, which he eschews because of lack of real data on the issue, Ahmed reviews the costs of non-formal programs in Thailand, Kenya and Upper Volta and attempts an admittedly very rough comparison with formal schooling. For Thailand, he finds that the school equivalency courses are roughly one-third to one-half less costly than the regular school courses. In Kenya, he finds that the courses offered by the Village Polytechnic schools (organized on a self-help basis) have an average cost of 800 shillings per student-year (reported in 1969) compared with a cost of 2,000 shillings in the government secondary technical or vocational schools. In Upper Volta, the Rural Education Centers, which are very roughly equivalent to the primary schools, have annual recurrent cost per student averages of 5,500 CFAF compared with 12,000 CFAF for the regular schools. Of course, the major problem in comparison is that there is no indication of the relative quality or effectiveness of the graduates of the non-formal programs compared with those of the regular schools.

Thus, we see that non-formal education contains real ambiguities and contradictions. In many respects, non-formal education does appear to be a relatively low-cost, flexible and adaptable way of educating adults and rural dwellers in which instruction matches the needs of production. On the other hand, we see some of the sociological consequences of this type of education in a society where formal education is the usual means of social and economic advancement. Furthermore, we have seen how one form of non-formal education—that based on the works of Paulo Freire—may, indeed, have positive effects on production while providing the learners with a strong sense of social promotion. We must also not forget the lure of the adaptability of non-formal education due to our fascination with technology and our tendencies to try to incorporate it into our educational activities—non-formal education being particularly susceptible to innovative pedagogical methods. All in all, non-formal education does present many advantages such as low cost, adaptability to new instructional forms, the flexibility to adapt instruction to production, and the absence of the rigid institutional formality with which we are all so familiar in the systems of formal schooling. The reserves we have indicated about non-formal education are to be understood in a general context of the role of schooling in society (see Carnoy, 13), which is not to exculpate formal schooling. Rather, we see the problems of selection and the reproduction of social distinctions through education, formal or not, as being related more to the form of society than of education.

E. COST AND FINANCING OF A RURAL EDUCATION PROGRAM

1. The cost of a rural education program

Why is rural education important? We have suggested two arguments: first, that rural education will contribute to higher growth rates of agricultural output, and hence to rural development; second, that increasing rural education will contribute to more equal income distribution in Latin America. While these relationships are widely held beliefs, there is, in fact, very little evidence to support them. More education in the rural labor force may lead to or be associated with increased agricultural output, as we have shown, particularly in more "modern" situations. But the education/productivity relationship is difficult to measure. On the income distribution side, results are even more pessimistic: the estimates of education's contribution to income in the rural areas of most Latin American countries indicates that the return on more education in agriculture is low, especially at lower level education levels and especially in comparison with the pay-off in urban areas.

Our results for Colombia and Honduras tend to confirm this. The coefficients for lower secondary school in both the traditional and bananero sectors of Honduran agriculture indicate that there would not be a significant contribution to individual income for those who completed this level of schooling but did not continue to higher levels. For Colombia, the contribution of education to income is significant, but the coefficient is very small: increasing education from the sample mean of 2.36 years by 2.64 years to completed primary education would only increase income by 2.74 pesos per month from the average sample income of 694.17 pesos. These income figures may not represent productivity increases at all; income increases may be much lower than productivity increases associated with higher education, especially for more primary and lower secondary education. We just have no way of knowing whether productivity rises at the same rate as income in agriculture or at a lower or higher rate. However, we would guess that the rural income structure is such that income increases are lower than productivity, mainly because agricultural product pricing policy in Latin America is such as to favor urban areas—prices of staples are kept low so as to subsidize urban workers and therefore industrial and urban service investment.

Therefore, from a social standpoint, it may be worth investing in rural primary and lower secondary education, even though productivity increases in countries like Colombia and Honduras will not accrue to agricultural workers —those who take the additional education—in the form of higher income, but rather to those in urban areas or large landowners/wage labor employers in rural areas. Of course, if this hypothesis is true, it would have important implications for emigration from rural to urban areas, as has already occurred. Why should those with more education stay in rural areas if the income pay-off on their education is lower than in urban jobs? And if the opportunity for urban jobs declines significantly because of large immigration into urban areas, what would be the motivation for rural families to send their children to higher level schools (at higher ages, when they can be helpful at home or take a job?).

Even though there may be a reason, from a productivity standpoint, for investing in higher schooling levels in rural areas, our income figures augur badly for the income distribution effects on investing in mass rural education. One of the most persuasive arguments for investment in primary education in developing countries has been its potential for equalizing economic opportunity. But if our income/education estimates are correct, it is essentially impossible to redistribute income through education in rural areas even with large expenditures on rural primary and secondary education, at least in Honduras and Colombia. The effect of such investments would be to raise incomes somewhat, but not very much, relative to those with higher levels of education working in rural areas and certainly not very much relative to those working in urban areas, where salaries for the same level of schooling are considerably higher. For example, in Honduras we also took an urban sample in which the average income was about the same as in the bananero sector, 425 lempiras per month. According to our data, providing 3 years of "ciclo comun," for example, would have a negligible effect on this difference. Of course, this is not the most correct way of making such a calculation. We really should make estimates of the present value of the age income stream of those with a given level of schooling in the urban and rural area, and estimate how much this difference in present value can be reduced by increasing the level of schooling in rural versus urban areas, using the education/income relationship in the rural area. Levin has done this for El Salvador's urban secondary education in order to estimate how much of the earnings differences of urban workers from different socio-economic backgrounds with secondary education could be reduced with student loans for secondary and university education (16, chapter 5). The effect was found to be small. All this indicates that, even while public resources could be shifted to rural education, we should not expect the impact of such shifts to have much effect on the distribution of a country's income as long as the pay-off on more schooling in rural areas is low. The most obvious way to correct income differences between urban and rural areas and between the highly educated and the less educated is to alter the levels of incomes paid to people in different sectors and in different kinds of jobs, particularly those jobs associated with high levels of education and those associated with low levels.

Nevertheless, we may want to invest in rural education anyway, even under the prevailing pattern of incomes. What would it cost countries like Honduras and Colombia to provide a comprehensive rural education program? What did it cost Cuba to do this?

Let us answer the second question first, since the Cuban data will give us a good approximation of the total cost of a comprehensive program of rural education in a country that actually undertook such a program. According to a speech by Fidel Castro in 1973, the annual costs per student for the 1973-74 academic year were the following: primary—104 pesos; primary boarding—331 pesos; primary semi-boarding—1,976 pesos; secondary—290 pesos; secondary boarding—488 pesos; secondary semi-boarding—361 pesos; and secondary *básico en el campo*—659 pesos. Since he did not give any differences in cost between urban and rural primary schools, we will assume that costs per student are the same. There were approximately 711,000 (average enrollment) rural primary school students in Cuba in 1973, or about 90% of the primary school age population in rural areas in that year (by 1976, essentially 100% of the rural school age population was in primary school). Table IX-12 presents approximations of the costs of rural primary schooling for youth (it does not include adult education), according to three hypotheses: (1) that there is no boarding or semi-boarding; (2) that there is all semi-boarding; and (3) that there is semi-boarding for 80% and boarding for 20% of rural students. As may be seen, the youth component of rural primary education costs between 1.2 and 2.5% of GDP in Cuba in 1973. We will use the midpoint of these two figures as an approximation of the real cost—about 1.8% of GDP.

We do not have data on the breakdown of Cuban secondary education enrollment by urban and rural students, in part because many urban students attend basic secondary school in rural areas. But we will "guestimate" that one-third of secondary students come from rural areas. This figure is based on the fact that, of the 1965-66 cohort who entered primary school, 34.2% of those in urban elementary school graduated, while of those in rural elementary schools, only 11.7% graduated, or about one-third the urban figure. There were 266,000 pupils in the general secondary level in 1973 (49, pp. 296-297), of which about 88,000 were from rural areas. Again, if we make the three assumptions we made for rural primary about boarders, total expenditures for secondary schooling for rural students are as shown in Table IX-13.

Using the midpoint of these figures, 0.5% of GDP, we find that the primary and secondary school expenditures on rural students together represented about 2.3% of GDP in 1973, this in addition to the 7.8% of GDP spent on other forms of education, including educational construction. It should be also remembered that these do not even represent the total of expenditures on rural education for youth at these two levels, since many students from urban areas are in rural schools, and other rural students at the secondary and even primary level are in special schools. The costs also do not include adult education, non-formal training programs, and the income forgone by students while they are in school. On the other hand, the Cubans were offsetting part of secondary school costs by the *escuelas en el campo*, which included many students from rural areas. By 1973-74, approximately 50,000 or 20% of general secondary level students were in such schools and meeting a high percentage of their current costs (659 pesos per year) by working 20 hours a week on farms directly connected with the schools, but this figure still does not include income forgone. Thus, in terms of current public expenditures, we have probably slightly overestimated the costs of primary and secondary education for rural students in Cuba.

Considering that there were about 100-150 thousand peasants in worker-peasant education in 1973 (14, Table 6), and that this education was almost entirely at the primary level and non-boarding, we have to consider that Cubans were spending an additional 13 million pesos approximately on peasant adult education, about 0.2% of GDP. Of course, this figure is low in 1973 because most adults were educated at the primary level during the 1960's (peasant/worker education reached its peak in 1964 when the enrollment was more than 800 thousand). But in any case, let us take a figure of 2.5% of GDP for public expenditures on rural education in Cuba, a total of about 150 million pesos, or about US$160 million. In subsequent years, this figure has increased because of increased enrollment at the secondary level.

To calculate hypothetical costs for Colombia and Honduras, we have to estimate the number of potential rural students at the primary level and to make some approximation of the number of rural secondary students in lower level secondary education. For rural primary costs, we can make several different estimates, based on different assumptions about the type of education to be provided: (1) all formal education at the average cost of rural formal education; (2) formal education using radio and cassettes plus less educated monitors instead of fully-trained teachers, at a cost savings of about 25%; (3) non-formal education only for those not now in school, at one-third the cost of formal education (of course, we do not know if this type of education will have the same productivity effect as formal schooling).

Jean-Pierre Jallade estimates that there were about 5 million rural youth between the ages of 5 and 25 years of age in Colombia in 1970 (31, Table 3.12). Of these, only 23% (1,200,000) were (or had been) enrolled in primary education. He also estimates that the average cost of rural primary education is one half that of urban primary education, or 553 pesos per student in rural areas in 1970 (31, Table 3.13). Thus, if the Colombian government were to enroll all those 5-25 years olds who had never attended primary school plus those who are now in rural primary school at the same 553 pesos of 1970, the total public expenditure under the different assumptions above would be as shown in Table IX-14.

Interestingly enough, the all formal and cheap formal solutions are close to the same percentage of GDP as in the Cuban case. However, there are two important differences: first, the expenditures per student in Colombian primary education in 1973 were about one-sixth those of Cuban schools (49); and second, although the hypothetical expenditures shown above were about the same percentage of GDP as in Cuba, they were about three times as high a percentage of total public expenditures on education as in Cuba, which reflects the small percentage of GDP spent on education in Colombia. We should also not forget that, even counting the significant percentage of urban Colombian children in urban private schools, at all levels, only about one-half of urban Colombian youth between the ages of 5 and 25 were in school in 1970 (31, Table 3.10). This means that the above-mentioned rural education program would have to be added to a large increase in public expenditures on urban education to get everyone into primary school.

For rural secondary level education let us make three assumptions: (1) rural secondary education at the full urban cost; (2) rural secondary education at two-thirds of urban cost; (3) one-half of secondary education in "escuelas en el campo" of the Cuban type, secondary schools that cover all their current and capital costs by student agricultural production and one-half at full urban cost. We also assume that the number of secondary students in rural areas will equal the number of public secondary students in urban areas, which is only one-half the total secondary students in urban areas, since one-half go to private schools. This number was 341,000 in 1970, and the cost per student in urban secondary schools was 3,800 pesos in 1970 (31, Table 3.13).

The lowest of the figures presented in Table IX-15 is the same as the Cuban figure for percentage of GDP but—as in the case of rural primary costs—even this figure is almost triple the Cuban figure for percentage of total public educational expenditures.

To sum up, we see that, even without adult education in rural areas, an integral program to get everyone of school age into primary schools and a reasonable percentage of them into rural secondary schools, will run about 2% of GDP and would greatly increase educational expenditures in Colombia. This assumes cost savings mechanisms at both the primary and secondary levels, so it is anything but a maximum cost figure.

Making the same calculations for Honduras, we find that in 1970 (according to UNESCO figures), Honduras' public education expenditures were 44.2 million lempiras ($22.1 million), 64.2% of which went to primary education for the 382,000 students at that level. Of these students, 190,000 were rural primary students. If we make the same assumption as Jallade did for Colombia—that the expenditures per student in rural primary schools is one-half that of urban primary expenditures—we estimate that rural primary expenditures were about 50 lempiras per student in 1970. Furthermore, we estimate that there were about 600,000 children between the ages of 5 and 16 in Honduras' rural areas in 1970. We chose the smaller age group here because, unlike Jallade, we do not have the data to calculate how many young people between the ages of 5 and 25 have already been to school and how many had not.

Under the same assumptions about primary education that we made in the Colombian case, what would be the cost of primary education for all children between 5 and 16 years old in rural areas?

Although the figures presented in Table IX-16 are very approximate, we see that as percentages of GDP they are almost identical with the Colombian figures. The percentage figures on educational expenditures are higher for Honduras because we do not know the educational expenditures of non-central government public entities.

Finally, for Honduras' secondary education, we guess that there are at least as many students in private secondary schools as in public. The total number of general secondary students in 1970 was about 36,000, approximately 18,000 of whom were in public schools. Public expenditures on these 18,000 was 6.8 million lempiras, or 380 lempiras/student. We assume, as in the Colombian case, that an integral education program would bring in at least as many rural students into secondary school as in public urban secondary schools in 1970.

The percentage figures presented in Table IX-17 are lower in Honduras than in Colombia, largely because of the more modest rural secondary school enrollment proposed. Nevertheless, the total rural program (primary plus secondary) is still about 2% of GDP.

2. Financing rural education

We cannot, in so short a study, make an analysis of how to finance rural education. But it is worth making a few comments on the effect of various financing schemes on income distribution in the countries we have studied.

As we mentioned, Cuba finances education in two ways: it keeps wages—especially higher wages—lower than they might be in a "competitive" labor market in a capitalist society, and uses the income accruing to the State in part (and in fairly large part) for education. In the late 1960's, Cuba spent about 7.5% of GDP on education and now that figure has risen (in 1975) to more than 12% of GDP. Most of the education budget goes to primary and lower (basic) secondary education. The second way it finances education is to incorporate production into the education process. Students at the secondary, and even to some extent at the primary, level work as part of their schooling. These 20 hours per week spent working in agriculture covers—according to Cuban officials—the current costs of basic secondary education and boarding for the students in the escuelas en el campo. Cubans see such schools in rural areas for both urban and rural students as a solution to the high cost of education. Their product, incorporated into the agricultural plan, substantially lowers the cost of their education without detracting from their scholastic achievement. But before considering the transferability of this method of financing rural secondary education, it should be remembered that there is room for the graduates of such schools in productive jobs in Cuban agriculture. Simply giving youth agricultural training doesn't guarantee that they will stay in rural areas. There must be rewarding work for them to do.

We have estimated that the cost of an integral rural education program seems to be about 2-2.5% of GDP in the three countries studied. This is a lot of money and represents a significant increase in the education budgets of Colombia and Honduras (and other Latin American countries as well). How could Colombia and Honduras raise this money? Jallade suggests that public primary education is a subsidy to lower income groups. We have indicated that investing in rural primary education will have little effect on reducing the income differences between urban and rural wage earners or between primary and higher educated rural workers. The pay-off on primary education, according to our estimates, is simply too low. But if this primary education investment is financed by taxes on higher incomes (the incomes of the higher educated), income differences after taxes and public expenditures will be reduced, not by the pay-off on primary education, but by the shift of resources from higher to lower income families.

We have estimated, for example, that, on the basis of 1970 data, it would cost about 3 million pesos to provide an integral rural education program in Colombia. Taking Jallade's figures for distribution of income among Colombian households in 1970 (31, Table 3.3), we see that the total income of those Colombians earning more than 120,000 pesos per year is about 27 million pesos. This means that, if the Colombian government would tax just this level of income at an average of 11 additional percentage points, the money for rural education could be raised. Such a tax, if applied progressively, would also have a significant impact on the post-tax, post public expenditure distribution of income, particularly since the money would be used for the education of the lowest income group in the society.

There are other ways of financing rural education, but they are probably not as desirable in the long run. First, public money could be shifted from higher to lower levels of schooling. In the Colombian case, for example, total public expenditures on higher education were about 1 million pesos in 1970. This money could be shifted to rural primary schooling and all higher education made private. On the one hand, this would force the middle and higher classes to bear the costs of their higher education (very few lower-class children go to higher education institutions in Colombia), but, on the other hand, as Jallade has pointed out, this would have the effect of redistributing income in a more equal way in the short run, but would probably create more inequality in the longer run, as only the better off members of Colombian society would receive higher education.

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STATISTICAL APPENDIX

Table IX-1. Latin America: Minifundios and Latifundios in the Agrarian Structure of Selected Countries, 1963

	Minifundios		Latifundios	
Country	% of farms	% of occupied land	% of farms	% of occupied land
Argentina	43.2	3.4	0.8	36.9
Brazil	22.5	0.5	4.7	59.5
Chile	36.9	0.2	6.9	81.3
Colombia	64.0	4.9	1.3	49.5
Ecuador	89.9	16.6	0.4	45.1
Guatemala	88.4	14.3	0.1	40.8
Peru	88.0	7.4	1.1	82.4

Source: Furtado, Economic Development of Latin America, p. 54.

Table IX-2. Latin America: Agrarian Structure Indicators in Selected Countries, 1965

	Minifundios	Family farms	Medium sized farms	Latifundios
Argentina				
% of total farmland	8	46	15	36
% value of agric. product	12	47	26	15
% of labor employed	30	49	15	6
Brazil				
% of total farmland	—	6	34	60
% value of agric. product	3	18	43	36
% of labor employed	11	26	42	21
Chile				
% of total farmland	—	8	13	79
% value of agric. product	4	16	23	57
% of labor employed	13	28	21	38
Colombia				
% of total farmland	5	25	25	45
% value of agric. product	21	45	19	15
% of labor employed	58	31	7	4
Guatemala				
% of total farmland	14	13	32	41
% value of agric. product	30	13	36	21
% of labor employed	68	13	12	7

Source: Furtado, Economic Development of Latin America, p. 55.

Table IX-3. Latin America: Farm Efficiency Indicators of Selected Countries, 1966
(Index: minifundios = 100)

	Value of output per hectare of total farmland	Value of output per hectare of acreage under cultivation	Value of output per agricultural worker
Argentina			
Family farms	30	50	250
Medium-sized farms	50	62	470
Latifundios	12	49	620
Brazil			
Family farms	59	80	290
Medium-sized farms	24	53	420
Latifundios	11	42	690
Chile			
Family farms	14	32	179
Medium-sized farms	12	25	317
Latifundios	5	21	440
Colombia			
Family farms	48	90	418
Medium-sized farms	19	84	768
Latifundios	9	80	995
Guatemala			
Family farms	56	80	220
Medium-sized farms	54	122	670
Latifundios	25	83	710

Source: Furtado, op. cit., p. 56.

Table IX-4. Honduras: Means and Standard Deviations For a Representative Sample of Workers in the Agricultural and Bananero Sectors

	Agricultural sector N = 98		Bananero sector N = 161	
Variable	Mean	S.D.	Mean	S.D.
Sex (0 = female; 1 = male)	0.82	0.34	0.69	0.46
Low socio-economic status of parents (SES)	0.81		0.59	
Medium SES	0.13	0.34	0.29	0.46
High SES	0.06	0.24	0.12	0.32
Salary (in Lempiras)	226.74	198.88	424.77	327.05
Total months worked in present firm	53.98	73.84	139.93	107.56
Average number of hours worked per week	48.28	6.70	45.80	6.02
Years of schooling	8.27	2.16	9.91	3.00
Age	27.3	—	32.9	—
Attended private secondary school	0.15	0.36	0.52	—
Attended public secondary school	0.51	—	0.23	—

Source: Proyecto Red de Sistemas Educativos para el Desarrollo en Centroamérica y Panamá, Investigación Piloto sobre la Demanda de Carreras Cortas en el Mercado de Trabajo de Honduras.

SES = Socio-economic status

Table IX-5. Honduras: Regression Estimates for Income (Using the Natural Logarithm of Income) in the Agricultural and Bananero Sectors

	Agricultural sector N = 95		Bananero Sector N = 161	
	b	beta	b	beta
1. Sex (0 = female; 1 = male)	0.62	.28*	0.07	.05
2. Medium-level SES	−0.65	−.26*	0.19	.14*
3. High-level SES	0.67	.18**	0.06	.03
4. Completed university	(no cases)		1.58	.44*
5. Incomplete university education	1.06	.12	0.47	.17**
6. Completed educación superior	(no cases)		2.13	.27**
7. Incomplete educación superior	(no cases)		0.95	.12**
8. Completed educación diversificada	1.32	.52	0.42	.32
9. Incomplete educación diversificada	0.15	.05	0.03	.02
10. Completed ciclo común	0.24	.06	0.12	.05
11. Incomplete ciclo común	0.06	.03	0.04	.03
12. Age: 21–25 years old	0.02	.01	0.14	.09
13. Age: 26–30 years old	0.22	.11	0.22	.15
14. Age: 31–35 years old	0.21	.08	0.30	.16
15. Age: 36–40 years old	0.52	.15	0.14	.07
16. Age: 41–45 years old	−0.41	−.11	0.09	.05
17. Age: Over 46 years old	0.43	.11	−0.12	−.06
18. Age: no response	0.55	.11	−0.18	−.04
19. Studied in private secondary schools	−0.22	−.09	0.13	.10
20. Incomplete secondary school	−0.34	−.19	0.04	.03
21. Working in Central Zone	0.59	.32**	(no cases)	
22. Working in Northern Zone	0.63	.32**	(no variation)	
23. Average hours worked in past 3 weeks	0.02	.17**	−0.003	−.03
24. Married	−0.26	−.15	0.04	.03
25. Divorced	−1.10	−.13	−0.01	−.004
26. Whether at present studying	−0.004	−.001	0.05	.03
27. Total months worked in present firm	**0.005**	**.41***	**0.003**	**.50***
Constant	2.68		5.00	
R^2	0.42		0.47	
F value for the equation	3.50		6.08	

Source: Projecto Red de Sistemas Educativos para el Desarrollo en Centroamérica y Panamá, Investigación Piloto sobre la Demanda de Carreras Cortas en el Mercado de Trabajo de Honduras.

*Significant at .10 level or better.

**Significant at .05 level or better.

All variables except 23 and 27 are dichotomous; the left-out variables are: for SES (2–3), low SES; for schooling (4–11), completion of primary school; for age (12–18), under 20; for type of school (19–20), public secondary school; for location (21–22), the south; and for civil status (24–25), single.

Table IX-6. Honduras: Regression Estimates for Educational Level (Years of Schooling) in the Agricultural and Bananero Sectors

	Agricultural sector N = 100		Bananero sector N = 162	
Independent variable	b	beta	b	beta
1. Medium level SES	2.86	.45*	1.47	.22*
2. High level SES	2.27	.25*	1.96	.21*
3. Sex (0 = female; 1 = male)	0.09	.02	0.58	.09
4. Age: 21–25 years old	−0.01	−.002	0.71	.09
5. Age: 26–30 years old	−0.12	−.02	0.45	.06
6. Age: 31–35 years old	0.07	.01	1.18	.14
7. Age: 36–40 years old	−0.50	−.06	0.74	.05
8. Age: 41–45 years old	−2.25	−.25*	0.53	.06
9. Age: Over 46 years old	−1.66	−.17**	1.21	.12
10. Age: no response	−0.62	−.05	0.11	.005
Constant	7.96		8.15	
R^2	0.20		0.03	
F value for the equation	3.42		1.49	

Source: Projecto Red de Sistemas Educativos para el Desarrollo en Centroamérica y Panamá, Investigación Piloto sobre la Demanda de Carreras Cortas en el Mercado de Trabajo de Honduras.

SES = socio-economic status

*Significant at .10 level or better.

**Significant at .05 level or better.

All variables are dichotomous, the left-out variables being: for SES (1–2), low SES; for age (4–10), under 20 years.

Table IX-7. Colombia: Means and Standard Deviations for Census Sample of Agricultural Workers, 1973

Variables	Total sample		15–20 years old		21–28 years old		28–35 years old		36–44 years old		45–59 years old	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev	Mean	Std. dev.
Literacy	.684	.467	.739	.441	.734	.445	.689	.464	.641	.482	.613	.488
Years of schooling	2.361	2.952	2.573	2.762	2.506	2.781	2.373	3.00	2.224	3.085	2.122	3.097
Development												
• Rural backward	.220	.414	.218	.413	.215	.411	.220	.415	.222	.416	.222	.416
• Rural	.427	.495	.438	.496	.428	.495	.430	.495	.421	.494	.418	.493
• Semi-rural	.184	.387	.185	.389	.190	.392	.178	.383	.183	.387	.182	.386
• Semi-urban/urban	.169	.375	.158	.365	.167	.373	.171	.376	.173	.378	.178	.382
Topography												
• High	.141	.348	.144	.351	.135	.342	.135	.342	.138	.345	.154	.361
• Medium	.148	.355	.154	.361	.149	.356	.141	.348	.143	.350	.152	.359
• Low	.281	.449	.261	.439	.297	.457	.289	.453	.292	.455	.266	.442
• Mixed	.430	.495	.441	.497	.419	.493	.434	.495	.427	.494	.428	.495
No. of farms per household	.925	.434	.924	.424	.908	.427	.920	.441	.928	.426	.944	.450
Average size of farms (i.e., in hectares)	35.12	90.31	32.96	70.75	35.54	86.34	37.04	103.70	36.86	93.19	33.36	93.98
Average size of farms under sharecropping	10.99	15.64	10.91	14.77	11.21	15.40	11.35	17.30	10.96	15.65	10.53	15.23
% of rural population	63.67	22.35	64.64	21.70	63.29	22.02	63.92	22.31	63.28	22.53	63.27	23.12
Age	32.70	12.07	17.67	1.64	23.88	1.93	31.45	2.41	39.72	2.42	50.83	4.15
Income (pesos)	694.17	2193.45	445.74	702.95	591.70	1576.96	715.67	1958.60	844.33	2962.98	879.13	2927.48
% of cases	38481		756[illegible]		8074		7791		7035		8017	

Table IX-8. Colombia: Regression Estimate for the Availability of Secondary Schools (Number of Secondary Schools), 1973

Independent variables	B	Beta
Development[1]		
Rural backward	−5.631	−1.060
Rural	−4.870	−0.914
Semi-rural	−3.856	−0.468
% of rural population	−0.021	−0.182
Average size of farms in the town	−0.0004*	−0.021
Average size of farms under sharecropping tenure	0.0013*	0.006
Constant	7.676	
F-ratio	135.12	
R^2	0.486	

*Not significantly different from zero; all others are significant at least at the .05 level.

[1] The left-out, or reference, variable for this set is "urban".

Table IX-9. Colombia: Literacy Regressions: Total Sample and by Age Groups

	Total		15–20 years		21–27 years		28–35 years		36–44 years		45–49 years	
Variables	B	Beta[1]	B	Beta	B	Beta	B	Beta	B	Beta	B	Beta
Development[2]: Rural backward	−.066	−.059	−.074	−.069	−.072	−.067	−.033**	−.029	−.057	−.049	−.048	−.040
Rural	−.063	−.067	−.082	−.092	−.061	−.067	−.035**	−.037	−.061	−.062	−.030*	−.030
Semi-rural	−.050	−.041	−.062	−.054	−.054	−.048			−.029*	−.022	−.050***	−.039
Urban							.066	.054				
Topography[3]: High altitude	.088	.066	.030	.071	.094	.072	.080	.059	.069	.049	.101	.075
Medium altitude	.003*	.002	.003*	.002	−.015*	−.012	.023*	.071	.002*	.002	.002*	.002
Low altitude	−.144	−.139	−.147	−.146	−.144	−.147	−.138	−.135	−.153	−.145	−.141	−.127
No. of farms per rural household	−.003*	.002	.014*	.013	.014*	.013	.009*	.008	−.003*	−.003	−.017*	−.016
Average size of farms in town	.001	.020	$.2 \times 10^{-4}$	.013	$.15 \times 10^{-3}$	.029	$.9 \times 10^{-4}$	.020	.0001*	.02	.0001*	.021
Average size of farms under sharecropping	.0002*	.007	.0004*	.012	$.35 \times 10^{-3}$	.012	.0006	.023	−.0002	−.007	−.0001	−.004
Age in years	−.004	−.106	.003*	−.012	$-.2 \times 10^{-2}$	−.009	−.011	−.056	−.001*	−.007	.002*	.017
% of rural population	−.0007	−.034	$.6 \times 10^{-5}$	−.0003	$-.4 \times 10^{-3}$	−.019	−.02*	−.023	−.001**	−.042	−.002	−.079
Constant	.933		.753		.868		1.05		.831		.683	
F Ratio	155.21		25.5		26.2		28.97		20.59		24.55	
R^2	.043		0.036		0.034		.036		.031		.033	

[1] Beta: normalized coefficient.

[2] The left-out, or reference, variable is "urban" for all age groups except that for 28–35 years, for which "semi-rural" is the reference variable.

[3] The left-out, or reference, variable is "mixed altitude."

*Not significantly different from zero.

**Significantly different from zero at 5 per cent (all other coefficients are significant at 1 per cent).

Table IX-10. Colombia: Regression Estimate for Years of Schooling: Total Sample and by Age Groups

Independent variables	Total		15–20 years		21–27 years		28–35 years		36–41 years		45–49 years	
	B	Beta[1]	B	Beta	B	Beta	B	Beta	B	Beta	B	Beta
Development[2]: Rural backward	−.322	−.045	−.274**	−.041	−.320**	−.047	−.103*	−.014	−.314**	−.042	−.216*	−.029
Rural	−.373	−.062	−.374	−.067	−.249**	−.044	−.096*	−.016	−.400	−.064	−.344	−.055
Semi-rural	−.286	−.037	−.218*	0.031	−.151*	−.021			−.290**	−.036	−.311**	−.039
Urban							.611	.077				
Topography[3]: High altitude	.327	.038	.394	.050	.425	.052	.224**	.025	.199*	.022	.341	.040
Medium altitude	−.042*	−.005	−.011*	−.001	−.123*	−.016	.062*	.007	−.137*	−.015	−.013*	−.001
Low altitude	−.099	−.015	−.111*	−.018	−.146*	−.024	−.023*	−.003	−.035*	−.005	−.13*	−.020
No. of farms per rural household	−.045*	−.006	.038*	.006	−.109*	−.017	.007*	.001	−.014*	−.002	−.096*	−.014
Average size of farms in town	−.0003*	.010	−.001**	−.025	.2 × 10⁻³*	.007	.2 × 10⁻³*	.009	.9 × 10⁻³**	.027	.7 × 10⁻³**	.023
Average size of farms under sharecropping	−.0004*	−.002	−.002*	−.030	.001*	.005	.002*	.009	.8 × 10⁻³*	.004	−.003*	−.015
% of rural population	−.058	−.044	−.004*	−.030	−.008	−.062	−.028	−.039	−.005**	−.040	−.006	−.047
Age	−.014	−.058	.056	.033	−.022*	−.015	−.038	−.031	−.005*	−.004	−.003*	−.005
Constant	3.50		2.08		[illegible]		3.47		3.00		3.03	
F-Ratio	38.56		6.94		8.48		7.11		4.47		5.905	
R^2	.011		.010		.011		.009		.007	.008		

[1] Beta: normalized coefficient.

[2] The left-out, or reference, variable is "urban" for all age groups except that for 28–35 years, for which "semi-rural" is the reference variable.

[3] The left-out, or reference, variable is "mixed altitude."

*Not significantly different from zero.

**Significantly different from zero at 5 per cent (all other coefficients are significant at 1 per cent).

Table IX-11. Colombia: Regression Estimate for the Natural Logarithm of Income: Total Sample and by Age Groups

Variables	Total sample		15–20 years		21–27 years		28–35 years		36–44 years		45–59 years	
	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta
Development[1]												
—Rural backward	.130	.060	.198	.104	[illegible]	.084	.124	.057	.090**	.040	.092**	.039
—Rural	.165	.091	.206	.130	.209	.126	.210	.116	.084**	.044	.125	.063
—Semi-rural	.180	.077	.265	.132	.207	.099	.196	.084	.101	.041	.151	.059
Topography[2]												
—High	−.345	−.134	−.281	−.126	−.359	−.149	−.328	−.125	0.355	−.131	−.367	−.135
—Medium	−.022*	−.088	.018*	.008	−.026*	−.011	−.030*	−.011	−.080**	−.029	.012*	.004
—Low	−.088	.044	.057	.032	.065	.036	−.085	.043	.067	.032	.118	.053
No. farms/household	−.191	−.092	−.163	−.088	−.192	−.100	−.193	−.095	−.188	−.035	−.206	−.094
Average size of farms	$.2 \times 10^{-3}$	.026	$.5 \times 10^{-3}$	.048	$.2 \times 10^{-3}$*	.020	$.1 \times 10^{-3}$*	.016	$.3 \times 10^{-3}$	.034	$.2 \times 10^{-3}$*	.017
Average size of farms under sharecropping	$.9 \times 10^{-3}$	.016	.002	.036	$-.3 \times 10^{-3}$*	−.006	.001**	.022	$.4 \times 10^{-3}$*	.007	.001*	.020
Age	.010	.141	.052	.110	.021	.050	.004*	.011	.013	.036	.001*	.006
% of rural population	−.010	−.247	−.010	−.286	−.010	−.278	−.010	−.251	.010	−.234	−.009	−.212
Education (years)[3]												
None	−.251	−.134	−.041*	−.024	−.152	.085	−.292	−.155	−.353	−.184	−.456	−.230
1–2	−.187	−.094	−.050**	−.029	−.150	−.083	−.248	−.127	−.270	−.130	−.319	−.143
3	−.151	−.063	−.062**	−.031	−.125	−.060	−.134	−.078	−.263	−.101	−.217	−.078
More than 5	.728	.142	.270	.061	.520	.123	.905	.182	1.027	.183	.976	.151
Constant	6.543		5.531		6.303		6.833		6.586		7.040	
F-Ratio	521.42		88.19		100.88		112.05		103.97		105.63	
R^2	.169		.149		.158		.177		.181		.165	

[1] The left-out, or reference, variable for this set is the dummy variable for "urban."
[2] The left-out, or reference, variable for this set is the dummy variable for "mixed altitude."
[3] The left-out, or reference, variable for this set is the dummy variable for 4–5 years of primary schooling.
* Not significant at .05 level.
** Significant at .05 level, all others significant at less than .01 level.

Table IX-12. Cuba: Costs of Primary Education, 1973
(Thousands of pesos and percentages)

	A	B	C
1. Total cost	73,944	125,136	147,177
2. % of total educational expenditures	11.2	19.0	22.4
3. % of GDP	1.2	2.1	2.5

Table IX-13. Cuba: Costs of Secondary Schooling for Rural Students, 1973
(Thousands of pesos and percentages)

	A	B	C
1. Total cost	25,520	31,768	34,003
2. % of total educational expenditures	3.9	4.8	5.2
3. % of GDP	.4	.5	.6

Table IX-14. Colombia: Hypothetical Expenditures on Rural Primary Education, 1970
(Millions of pesos and percentages)

	Assumption 1 (all formal)	Assumption 2 (cheap formal)	Assumption 3 (formal plus non-formal)
1. Total expenditures	2,765	2,074	1,363
2. % of total 1970 educational expenditures (all govt. levels)	56.7	42.5	27.9
3. % of GDP	2.1	1.6	1.0

Note: For data on total public expenditures on education and GDP, see Jallade, (31), Annex 1.

Table IX-15. Colombia: Hypothetical Expenditures on Rural Secondary Education, 1970
(Millions of pesos and percentages)

	Assumption 1 (full urban cost)	Assumption 2 (lower than urban)	Assumption 3 (50% escuelas en campo)
1. Total expenditures	1,296	868	648
2. % of total 1970 educational expenditures (all levels)	26.6	17.8	13.3
3. % of GDP	1.0	0.7	0.5

Table IX-16. Honduras: Hypothetical Expenditures on Rural Primary Education, 1970
(Millions of lempiras and percentages)

	Assumption 1 (all formal)	Assumption 2 (cheap formal)	Assumption 3 (formal plus non-formal)
1. Total expenditures	30.0	22.5	16.3
2. % of total (Central Govt) educational expenditures (all levels)	67.9	50.9	36.9
3. % of GDP	2.1	1.6	1.1

Table IX-17. Honduras: Hypothetical Exenditures on Rural Secondary Education, 1970
(Millions of lempiras and percentages)

	Assumption 1 (full urban cost)	Assumption 2 (lower than urban)	Assumption 3 (50% escuelas en el campo)
1. Total expenditures	6.8	4.6	3.4
2. % of total (Central Govt) educational expenditures (all levels)	15.4	10.4	7.7
3. % of GDP	0.5	0.3	0.2

CHAPTER X

Financing of Technical and Vocational Training in Latin America

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INTRODUCTION

The purpose of this paper is to examine the role of technical education and particularly of vocational training systems in Latin America in terms of their relationships with the formal education systems and with the production structures of their countries. It will first briefly trace the history of technical education and, within it, the emergence of vocational training. It will then assess the importance of vocational training in relation to the development and state of the national education and production systems. It also includes an analysis of the internal characteristics of vocational training systems in relation to their costs and financing and, finally, explores their possible impact on the labor force.

One of the first problems encountered in any effort to analyze the role of technical education and vocational training in Latin America is the lack of consensus on the very definitions of "technical education" and "vocational training." For the purposes of this paper the two terms are used to mean the set of learning activities aimed at "learning to do" as opposed to learning activities aimed at "learning to learn", which is the purpose of general or academic basic education. The difference between the two variants is that technical education is transmitted through the school system, whereas in Latin America vocational training has tended to move away from the traditional school context and into institutions of formal education established outside the school system, and disconnected from it, such as the SENAI in Brazil and the SENA in Colombia.

Historically, technical education and vocational training both trace their origins to institutions of two types, some outside and others inside the school system, whose function was to teach technical skills to the labor force. The first type, outside the school system, were the old "schools of arts and crafts", which gradually enlarged their basic education content and ended, in some cases, by joining the school system and becoming middle-level technical schools that have developed a complete "bachillerato" (secondary school) program. They are oriented mainly towards the training of industrial and construction workers and, more recently, towards that of agricultural workers. Their students are predominantly male. The second type, which sprang up inside the school system, includes schools that originally imparted only academic instruction, but in the course of time have gradually introduced vocational or technical subjects leading to the professions following the old French polytechnic pattern. Institutions of this type initially gave rise to normal schools where primary school teachers were trained, and to some industrial polytechnic schools. Later they offered "business" training in secretarial skills, shorthand and typing, and more recently have diversified so as to include subjects geared to the tertiary (services) sector. Their student body, in the more heavily attended teacher training and business courses, is essentially female. Recently a third generation of institutions has emerged at the secondary level on the model of the "comprehensive school" of the United States, which offer a mixture of academic and technical instruction designed to keep open the options for moving in either direction. An example of these institutions are the INEM's of Colombia.

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Apart from these formal teaching/learning processes, non-formal education alternatives have emerged, both in and out of the school system, in response to social pressures and financial limitations. Some of them have tended to formalize and institutionalize themselves, and have generally catered to highly specific population subgroups. Examples are certain adult literacy training programs and programs of agricultural extension, community development, home economics and family planning, specific vocational training (nursing, rural promoters, and the like). These programs have involved considerable experimentation with teaching methods, the use of audiovisual aids, and the use of radio, TV and correspondence courses; some of these programs, however, are fairly traditional. The basic aim of all these programs, which are relatively non-formal, is the training of the labor force, or some of its component groups, by imparting practical and useful knowledge, and transmitting attitudes and values consistent with the practice of their occupations.

Lastly, there are completely non-formal on-the-job training and learning processes that are perhaps the most traditional vehicles for training skilled workers and have always been the alternative to the formalization of technical training processes in or out of the school system.

This proliferation of institutions has been a response to the concern for relevance and usefulness of the product being turned out by the traditional education system. This concern heightened into crisis in Latin America when the countries began seriously considering industrialization and accelerated their economic growth after the Second World War. The first institutions specifically established for the vocational training of the working class date from that period. SENAI and SENAC in Brazil were established in 1942 and 1946; and the Universidad del Trabajo (University of Work) of Uruguay in 1943. In the other countries of Latin America many years passed without any more such institutions being set up. Then SENA was founded in Colombia in 1957 and CONET and INCE in Argentina and Venezuela, respectively, in 1959. In the sixties, similar institutions sprang up throughout the region.

As already mentioned, labor training institutions may be classed in two major groups on the basis of their teaching methods: on the one hand, there is "technical education", leading to the technical (industrial, commercial or agricultural) baccalaureate diploma at the secondary level. In Latin America there are technical institutes or schools that have the same or similar purposes; they require eight or nine years of formal schooling and provide two or three years of additional training in the practical aspects of technical occupations, and award a terminal diploma at the secondary level that leads or may lead to further studies on the university level. On the other hand, there is "vocational training", the purpose of which is to turn out apprentices (14–18 years of age), skilled adult workers (over 18), and middle-level technicians who can be employed as supervisors or foremen in different branches of activity. "Vocational training" courses are given by the above-mentioned vocational training institutes, which may be public or semipublic, or, to a minimal extent, private. In general, they require much less previous schooling than "technical education" because they use quite different methods for "teaching to do"; theirs is a practical training that requires inductive logic for moving from the simple to the complex through practical exercises designed to perfect techniques. As such it entails neither the basic principles nor the deductive capacity so much emphasized in traditional academic instruction. Technical education, on the other hand, starts from general principles and, through deductive logic, seeks to arrive at the same practical results in the learning of a trade. It can be much more flexible, be more conducive to technological innovation, and lead to more control over processes, but it involves more time in school, i.e., demands longer learning processes.

The manpower training strategies used in Latin America are a combination of "technical education", "vocational training", and "on-the-job training" as defined above.

Vocational training institutions such as SENAI and SENA are vocational training strategies for countries whose educational tradition is weak and in which the educational attainment of the working-class is very low; this is so in almost all the countries in Latin America. Moreover, these institutions may be suitable for countries where the scale of the industrial establishments is not very large and the pace of industrialization is relatively fast, as these factors tend to raise the cost of on-the-job training (because of the "economies of scale" associated with these processes and of the damage they can do to production). In fact, countries that have a stronger educational tradition and higher levels of schooling in the area, like Argentina and Uruguay, have types of vocational training different from those that predominate in the other countries. The more developed and industrialized countries, which are growing more slowly and already have a trained labor force that is large relative to the demand, like the United States, Japan, and the European countries, seem to give more emphasis to on-the-job training, which makes the Latin American experience in this regard highly relevant to the rest of the world.

A. VOCATIONAL TRAINING ENROLLMENT TRENDS

As mentioned earlier, the first institutions to specialize in vocational training in Latin America emerged in the forties with the founding of SENAI (1942) and SENAC (1946) in Brazil and of the University of Work (Universidad del Trabajo — UTU) in Uruguay (1942). The fifties saw the establishment of SENA in Colombia (1957), CONET in Argentina (1959), and INCE in Venezuela (1959). In 1975 these institutions had the highest levels of enrollment in labor training programs. In that year all the other Latin American countries except El Salvador and those of the Caribbean had institutions specializing in vocational training, although their enrollment levels were relatively lower than those of the institutions mentioned above. Some of them—such as Costa Rica's, for example—have experienced a burst of growth in the last few years.

The numbers enrolled in institutions of this type can be assessed in relation to the economically active population (EAP) of each country. This exercise is illustrated in Table X-1, which shows the enrollments from 1955 to 1975, and in Chart X-1, which depicts the enrollment ratios based on Table X-1 and the EAP in the years concerned, as drawn from ILO Estimates (12).

As can be seen, several tendencies are discernible, and it is useful to analyze first the countries with the oldest programs: Brazil, Uruguay, Colombia, Argentina and Venezuela. Of these, the Southern Cone countries where the levels of schooling are much higher than elsewhere on the continent, enrollment in the programs shows a moderately upward trend; in Uruguay, however, the enrollment between 1970 and 1975 held at around 3% of the labor force. This stabilization may be connected with Uruguay's economic stagnation in the last few years, but may also be due to a saturation relative to the juvenile population for, as will be seen below, in 1975 the enrollment represented 15% of the population between 15 and 19 years of age, which may be too high a proportion for a country of Uruguay's industrialization level. During the same period enrollment in Argentina was accelerating (see Chart X-1); in Brazil the number of participants in SENAI and SENAC grew at a pace similar to Argentina's until 1965, in which year the rate accelerated, particularly in SENAC, whose enrollment increased 23% a year between 1965 and 1975. Among the older institutes, however, those whose growth was most spectacular between 1960 and 1975 were, first and foremost, INCE in Venezuela, followed by SENA of Colombia. In Venezuela the annual enrollment amounted to 5.43% of the labor force and in Colombia, to 4.26%, the highest coverages in Latin America in 1975. Naturally, the ranking of enrollments in vocational training programs changes if they are stated as a proportion of the school-age population in each country, for in countries with a more slowly growing population like Uruguay and Argentina the ratio of school age population/EAP is much lower than in those with a faster population growth. This can be verified quite easily by comparing the enrollment ratios in vocational training, on the basis of economically active population, with the same enrollments stated in terms of the population 15 to 19 years old in 1975 in each country. This comparison is given for the five countries in question in Table X-2: as can be seen, in Argentina and Uruguay the enrollment in vocational training programs is considerably greater relative to the population aged 15–19 years than to the EAP, and in

Uruguay the former ratio is substantial—14.4% of the population most likely to enroll (15-19 years)—which may represent, as previously stated, a saturation level for a program of this kind.

The other Latin American countries have newer and relatively smaller vocational training institutions. Some of them, like INA in Costa Rica and IFARHU in Panama, are growing apace, while others, like those in Peru (SENATI) and Chile (INACAP), have relatively stagnating enrollments. Finally, the rest of the countries in the area have started from relatively low levels of enrollment at the secondary level (Nicaragua, Guatemala and Mexico) or relatively low *per capita* income levels (Bolivia and Ecuador) or both (Honduras and Paraguay), as shown in Table X-3 and Chart X-2. In these countries the vocational training institutes are of relatively recent origin and have not yet had much of an impact on the working population. In some of them, such as Honduras and Guatemala, they have tended to grow rapidly, while in others, such as Mexico, Bolivia and Nicaragua, their relative enrollments have remained small and shown no tendency to increase.

It is of interest to ask what factors have determined the different growth rates of enrollment in vocational training institutions in the various countries over the last 20 years. On the one hand, there is the factor of demand associated with opportunities for productive employment in industry and other modern economic sectors; on the other hand, there is the factor of supply associated with the growth of the training capacity and of the resources allocated to this kind of training under different financial arrangements. These two factors are not easily separable.

If we consider the initial situation confronting the countries at the start of the sixties in regard to economic development and the state of their education systems as depicted in Chart 2, which presents the countries on the basis of their *per capita* income (an indicator of economic development) and the enrollment ratio at the secondary level (an indicator of educational development), it is easily verified that, in general, the countries that in the seventies had the largest vocational training institutions, in the sixties were already at the most advanced levels of economic and/or educational development, whereas those that were not developing their vocational training institutes tended to be those with the lowest *per capita* incomes and secondary enrollments in the sixties. Colombia appears to be an exception—the only one; however, a look at its educational situation in 1975 shows that it is one of the countries where enrollments have increased most rapidly in the last 15 years.

There is, however, no straightforward linear correlation between the extent of institutional vocational training and economic or educational development. On the one hand, it is difficult to separate the effects of the two types of development, for the tendency is toward a high correlation between the two: the coefficient of determination for the situation in 1960 proved to be .60 for the 17 countries considered (and .71 if we exclude Venezuela, whose *per capita* income is not a good indicator of its level of development), though it appears to hold true that, among the countries that developed the most important vocational training institutions in the sixties, those that increased the number of participants most rapidly were those with lowest levels of schooling (Colombia, Venezuela and, to a lesser extent, Brazil). On the other hand, the enrollment in institutions such as those of Argentina (CONET) and Uruguay (UTU) tends to be chiefly in technical education, where levels of schooling are considerably higher than those among trainees in such institutions in Brazil, Colombia, or Venezuela and, as a result of their training methods and of the duration of the learning process, technical education tends to more closely resemble the formal education provided in the technical schools and technological institutes in other countries at what is in effect the post-secondary level. This fact tends to bear out the conclusion that vocational training is the predominant labor training strategy in countries with a weak educational tradition and in which, therefore, the level of schooling of the working class is generally relatively low, but where the education system is expanding rapidly enough to provide a broad enrollment base at the secondary level (see Table X-4).

Moreover, vocational training tends to turn out skilled workers, the demand for whom arises in the modern sectors of the economy, particularly industry, and hence the level and pace of industrialization is an additional factor in determining the best training strategy in a country. Table X-3, which presents a number of indicators of economic development in the region, shows that among the countries in which the level of schooling was relatively high in the sixties, only those with a relatively large secondary sector (industry and construction) have established vocational training programs. This explains why Panama and Costa Rica did not establish them in that decade, while Venezuela, Brazil and Colombia did.

If we look at the process of industrialization in the period 1960–75, we see that the countries with the greatest industrialization potential, such as Brazil, Argentina and, to a lesser extent, Costa Rica and Panama, significantly increased enrollments in vocational training (Mexico and Nicaragua are the exception). It can also be seen that in countries that have relatively high levels of industrialization on the basis of the value added by their secondary sectors in 1960 but whose industrial production has been relatively stagnant between 1960 and 1975, such as Uruguay, Chile, Peru and, to a lesser extent, Paraguay, the enrollment of their labor force in vocational training programs has been relatively stagnant. This demonstrates that demand factors are quickly reflected in the supply in the labor training markets.

On the other hand, it is clear from the foregoing discussion that, in many countries in Latin America, vocational training in institutions outside the school system has become very important as a source of supply of skilled labor. At the same time it may be observed that technical education inside the school system has entered a crisis stage in most of the countries in the area, to judge from the change in its relative importance between 1960 and 1975 (see Table X-4). The only countries in which its importance has increased during this time have been Chile and Peru, where both the system of vocational training outside the school system and the industrialization process entered a crisis stage in that period. Besides, in all the countries, including those that have developed extensive vocational training systems (Brazil, Colombia and Venezuela), and those that have not (Mexico), enrollment in technical education programs in schools has given way to enrollment in academic secondary schooling as schooling has increased everywhere in the area. This process is apparently connected, on the one hand, with the relative costs of the two labor training strategies and, on the other, with greater access of the working class to vocational training programs than to the "bachillerato técnico" (technical baccalaureate), which is located at a level of schooling that few future manual workers attain.

B. THE COST OF VOCATIONAL TRAINING

As reflected in the expenditure of the various institutions, the cost of vocational training varies considerably. Of the average total expenditure of all institutions in 1975, 82% was for operating expenditure, 15% for capital expenditure, and 3% for debt service. Operating costs ranged between 95-98% in countries such as Chile, Uruguay, Guatemala and Nicaragua, which were possibly not expanding their capacity that year, and 68-70% in Honduras, Bolivia, Paraguay and Peru, which definitely were. In countries with a large installed capacity, like Brazil, Colombia, Venezuela and Argentina, where enrollment is still on the increase, operating costs in 1975 ranged between 77% and 86% of total costs, as shown in Table X-5.

These operating costs include administrative costs, directing teaching costs (instructors) and other costs including teaching materials, supplies, public utilities, maintenance of installed equipment and, in some institutes, a reserve for amortization and depreciation of plant and equipment. On the other hand, very little comparative information is available on past investments or on installed capacity in machinery, equipment, buildings and land, on which to estimate the capital investment to be attributed to instruction of this kind. Hence international comparisons based on existing figures must be approached with great caution.

The expenditure of vocational training institutions must cover the cost of all the training activities each provides. Table X-6 provides a set of indicators for these levels of activity in 1975. As may be seen, SENAI and SENAC of Brazil and SENA in Colombia have the largest enrollments, followed by CONET of Argentina and INCE in Venezuela. The other institutions operated on a far smaller scale. In terms of courses initiated, Venezuela led with 16,114 courses in 1975. In terms of course-hours, Argentina led in 1975 with a total of 8,972 thousand course-hours,[2] while Colombia and Venezuela, with larger enrollments, accounted for only 2,798 and 2,633 thousand course-hours, respectively, that year. SENAC, with more than twice the number of students of CONET, accounted for only one-sixth as many course-hours.[3] In terms of total student-hours,[4] CONET (with 265 million student-hours) also led by a comfortable margin, followed by SENAI and SENA (93 million); Venezuela (with 20 million student-hours) lags far behind because, although it gives a much larger number of courses, the number of students per course is only one-sixth as great (see Table X-6).

A good indicator of the amount of vocational training given to a student in these institutes is the total number of course-hours, which is the same as the total number of student-hours if each student takes only one course a year. As indicated in column 6 of Table X-6, the training offered by Argentina is quite different from that provided in other institutions, and very similar to the kind of training given in technical schools and institutes within the school system in other countries. Though there is no information to confirm this, the Uruguayan system in the UTU is similar. A middle-level technical school offering 32 weeks of classes a year and 40 hours of instruction a week provides an annual course of 1,230 hours, which is exactly the number reported by CONET for its vocational training.

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[2] Total course-hours are obtained by adding up all the class-hours in all the courses in one year.

[3] For SENAI and UTU there is no information on the number of course-hours, but it is assumed that SENAI ranks second to CONET.

[4] Total student-hours are obtained by adding up the hours taken by all the enrolled students.

These differences in the number of hours of vocational training courses in different institutions are reflected particularly in the teaching cost/student, as shown in Table X-7. Argentina is an extreme case, having five times the average number of instruction hours/student and incurring a teaching cost/student seven times the average. The variation is much less among the other institutions. When other components of operating cost/student are considered, major economies of scale come into view. For the larger institutes—SENAI, SENAC, SENA or CONET—the administrative and other operating costs are well below those of the other institutes, which operate on a much smaller scale. Naturally, the composition of the inputs varies greatly with the kinds of courses offered, and the variation is reflected in the cost per student. For example, SENAI, specializing in courses geared to modern industry, which call for workshops and equipment that are quite expensive, has an operating cost/student four times higher than that of SENAC, which specializes in commercial courses and services that do not call for very costly installations or many inputs other than the instructor's time.

Because of the differences in the quantity of instruction, measured in hours, that the average student receives in the different institutions, the best cost indicator is the operating cost per student-hour, as shown in Table X-8. As may be seen, these costs are fairly low in SENA in Colombia, CONET in Argentina, INACAP in Chile, and SNPP in Paraguay; average in FOMO in Bolivia, SENAI in Brazil, INA in Costa Rica, and SENATI in Peru; and fairly high in the other countries, expecially Mexico and Central America.[5] In general, the larger institutes tend to have low operating costs per student-hour, except in INCE in Venezuela, where this cost is very high. However, there are small institutes, some of them quite new, where these costs are also very low, such as FOMO in Bolivia and SNPP in Paraguay which, because of the relatively long duration of their courses, are apparently intermediate cases in terms of educational technology falling between the institutes most definitely oriented toward the formal education system, such as CONET and UTU, and the other institutes, like SENAI and SENA, with their less scholastic instruction. The countries where the hour of instruction is most expensive are those where, excepting Chile, the fewest hours of instruction are given per course.

Moreover, it is interesting to compare the costs of vocational training with those of technical education inside the school system. For Colombia, for example, though the expenditure items are not strictly comparable, some idea of orders of magnitude can be obtained by comparing the cost per student-hour for the technical institutes, assuming 1,280 hours of training a year (32 weeks/year with 40 hours/week of instruction). This comparison yields the following results:

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[5] There is no information on UTU in Uruguay or on SENAC in Brazil, but, to judge from other indicators, this cost must be low in these two institutes.

Type of Institution	Cost/Student-Hour (US$)[6]
ITI	.14
INEM	.24
ITAS	.45
SENA	.25

As can be seen, in Colombia, one of the countries in which the cost of vocational training (per student-hour) is lowest, this cost is comparable to that of INEM, an institution recently established on the model of the "comprehensive school" in the United States, and exceeds the cost per student-hour in the more traditional industrial technical schools, even though the cost calculated for SENA tends to underestimate the capital costs.

In the operating costs of the vocational training institutes there may be two opposing tendencies at work: on the one hand, a greater centralization of teaching activities permits better internal allocation of resources, avoids some of the problems of underutilization of capacity that seem to be present in some technical schools, and permits greater systematization of teaching practices through programmed teaching methods and other teaching innovations that are only warranted if they can be applied on a large scale; on the other hand, however, the greater diversity of short courses in vocational training than in technical education and the possibility of saturating the market for skilled workers in the face of a steadily rising flow of income, can introduce inefficiencies that will tend unnecessarily to increase the coverage or the cost per student in these institutions. In some countries—Nicaragua, Mexico, Honduras and Venezuela—the cost per student-hour seems very high compared with the levels in Argentina, Brazil, and Colombia, which do not appear to be turning out workers with lower or fewer skills.

C. THE FINANCING OF VOCATIONAL TRAINING

The main sources of financing of the vocational training institutions in Latin America are specified compulsory contributions from private enterprise and government budgets; external assistance is of lesser importance in the present context. Thus, it may be said that these institutions are financed, in general, through compulsory contributions from persons and firms, and a distinction must be drawn between those that come from the general revenues of countries and those that come from special-purpose taxes. The second source, when utilized, takes the form of a payroll tax, which varies with the size of the firm and its ownership (whether public or private). The only cases in which other taxes are used, which in any event only supplement those already mentioned, occur in Ecuador (SECAP) and Venezuela (INCE). Ecuador has a 0.2% levy on the importation of industrial equipment and Venezuela, a 0.5% charge on the wages of trainee workers.

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[6] The data for the industrial technical institutes (ITI's), the diversified intermediate institutes (INEM's) and the agricultural technical institutes (ITA's) are taken from a study on the costs of education in Colombia by Reyes *et al* (15); and the data on SENA are from Table X-8.

Thus, the predominant form is the specific payroll tax (see Table X-9), since only five of the seventeen institutions considered[7] are not financed by it.

The tax rate ranges between 0.5% and 2% for private firms employing more than five or ten workers, and is usually lower, almost always 0.5%, for the government and its decentralized agencies.

In countries that have no special-purpose taxes the institutions are of one or another of two extreme kinds: there are FOMO, ARMO and INA, which are relatively undeveloped, and there is UTU, which, as has been said, may be regarded as part of the formal education system because of the relatively long duration of its regular courses of instruction. INACAP, in Chile, stands midway between these extremes. On the one hand, it is a relatively highly developed institution but, on the other hand, its average course is relatively short. The Argentine institution, CONET, like those mentioned above, is financed mostly from the public budget (84% in 1975), and, on the basis of the average duration of its training courses,[8] may be classed with the UTU as part of the formal education system. Thus, the institutions that do not rely on special-purpose taxes are either relatively undeveloped or have a strong institutional basis rooted in their links with the formal education system.

The advantages and disadvantages of special-purpose taxes are fairly well known (10), and their importance in formal and non-formal education systems, in particular, is questioned (7).

One advantage attributed to special-purpose taxes is the security the beneficiary institution enjoys when the rate is high enough and the tax base shows a significant growth rate. An examination of the development of vocational training systems financed chiefly by special-purpose taxes shows that the most dynamic are those that have imposed a high (2%) tax on the payrolls of private firms (SENA, INCE), followed, though with slower growth, by those which, although imposing a lower rate (1%), have achieved high growth rates in the sectors that constitute the tax base. Finally, vocational-training systems that do not have an adequate tax rate or a tax base that is at all dynamic, have remained stagnant and, in fact, some of them do not even appear to have reached the take-off stage (see Chart X-1 and Table X-1).

There are, then, two sources from which the institutions we are concerned with have been successfully financed: first, the special-purpose taxes imposed on dynamic sectors of the economy at rates that generate substantial revenues, and second, the ordinary funds of the public budget, which appears feasible only where there is a highly developed formal education system to serve as a platform for the development of technical education institutions. Typical cases of the first occur in Colombia, Venezuela and Brazil, while Uruguay, Argentina and

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[7] FOMO (Bolivia), INACAP (Chile), ARMO (Mexico), INA (Nicaragua) and UTU (Uruguay).

[8] 1,280 course-hours, which amounts to the duration of a secondary-level course of 32 weeks/year, 8 hours a day.

Chile offer instances of the second. Moreover, the Costa Rican and Panamanian institutions display a pronounced dynamism that arises from the relatively favorable conditions of the generally advanced state of formal education and, in the case of Costa Rica, from the existence of special-purpose taxes that generate sufficient revenue.

It may be asserted with relative certainty that, if priorities have been set for the development of the vocational training system, they can be attained in a "natural" way once the formal education system is highly developed or, alternatively, they may be attained by channeling a substantial amount of resources through special-purpose taxes imposed on dynamic economic sectors that presumably will benefit from the availability of better trained skilled labor.

The other face of the coin, the disadvantages of special-purpose taxes, lie precisely in the economic distortions that can be generated by taxing sectors that do not necessarily benefit in part or in whole from the investment of the resulting revenue. The impossibility of saying the last word on this subject was pointed out in a earlier similar study. However, the fact that special-purpose taxes for the financing of vocational training can vary within only narrow limits allows a number of conjectures on the subject that can prove quite sound. As previously mentioned, the general case is that of the payroll tax on firms employing more than five (or ten) workers. Private firms are generally taxed more heavily than public or semipublic entities, and there are isolated cases of levies on workers and on machinery imports. The payroll tax is the more frequent and therefore merits closer scrutiny. This kind of special-purpose tax has two noteworthy primary effects: one is the distortions it can generate in the allocation of resources, and the other is its redistributive effect. With regard to the first effect, as labor becomes more expensive, the demand for it might be expected to diminish; however, this is significant only where wages are subject to institutional rigidities in the labor market, such as those that can be introduced by minimum wage legislation or trade unions. If wages are flexible, adjustments in the various factor markets counteract the impact of the initial effect. Even assuming that this initial effect is counteracted by secondary adjustments, the maximum reduction in employment could be derived from the demand for labor as:

$$\left(\frac{dL}{L}\right) = \left(\frac{Lmod}{L}\right) \cdot e_1{}^{d} \cdot \left(\frac{dw}{w}\right)$$

where:

$\frac{Lmod}{L}$ = the proportion of total employment affected by the payroll tax,

$e_1{}^{d}$ = the wage elasticity of the demand for labor, and

$\frac{dw}{w}$ = the effect of this tax on wages in proportional terms.

If we assume that the highest payroll tax rate (*dw/w*) is 2%, that the employment generated by the contributing firms (*Lmod/L*) hardly exceeds 25% of total employment, and that the wage elasticity of the demand for labor ($e_1{}^d$) is low, and in any case less than unity,[9] it is highly probable that the loss of employment due to the payroll tax could not exceed 1/2% (that is to say, (d/L) max. $= 0.25 \times 1 \times 0.02 = 0.005$), and is usually somewhat lower.

Now, most of this lost employment affects persons that earn the minimum wage and have few skills, since they are the persons most likely to become unemployed on account of the payroll tax. In this case the drop in the demand for labor affects them more than it does skilled workers. If later the yield of this tax is used to increase the supply of skilled workers, the medium-term effect is to reduce the wage spread between skilled and unskilled workers, which stimulates the demand for skilled at the expense of unskilled workers. This is consistent with a long-term worker training strategy in the framework of economic development in which bottlenecks in the supply of skilled labor would not arise.

As regards the redistributive effects, the burden of this special-purpose tax is clearly redistributed between the firms and workers that produce the goods concerned and the consumers who purchase them; but determining the proportions of this redistribution is a complicated matter, as was pointed out in the work of Castro *et al.* It is not clear that it is worthwhile to make a complete, detailed study with specific answers for all cases, instead of merely illustrating general cases with plausible values for the different relevant ratios. Depending on whether the markets for the different goods are more or less competitive, it may be expected that as little as 50% or as much as 100% of the additional cost will be passed on to the consumer, which, if labor costs account for 50% of the value added, implies that, if the tax rate is 2%, the price may be expected to rise between 1/2% and 1%, on a one time basis—when the tax is first imposed. Though it must not be forgotten that, compared with direct taxes, taxes of this kind do have regressive features, it must be noted that they can be offset by very small gains in productivity, if these are passed on to the consumer. This is because these gains are permanent and flow continuously, unlike a one-time cost. The key question then is whether it is possible to achieve productivity gains and pass them on to the consumer, either through higher production without raising prices or through lower real prices in the future. That they can be passed on is quite clear, for the ultimate result of vocational training is an increase in the supply of skilled labor, which prevents cost increases due to a scarcity of such labor. The feasibility of obtaining productivity increases that are not converted solely into wage increases or profits still has to be determined. This makes the problem of distortion and redistribution dependent on solving the problem of the effects of vocational training on production, a question touched upon below. Thus, it is important to try to shed light on this matter by making specific studies that will measure the productivity gains produced by the various kinds of vocational training in different occupations and economic sectors.

Other redistributive aspects of the system of special-purpose taxes relate to a comparison of the origin of the financing and the ultimate occupations of the persons trained. In this regard two forms of redistribution have usually been mentioned: one that can arise between economic sectors and the other, according to the size of the enterprise. The results obtained by Castro *et al.* are confirmed here in that the ratio of enrollments in courses related to the sector to tax yields from the sector, is greater for the primary than for the secondary sector, and greater for the secondary than for the tertiary sector. Similarly, all firms above a certain size are liable to the tax, whereas perhaps only the largest of them are able to use well trained personnel. These two aspects have implications only to the extent that there are major imperfections in the labor markets to which the trained persons migrate or in the markets for the goods produced by them, but none in the rest of the economy. As was seen before, the question is: how much of the costs and benefits are passed on to the consumer? The magnitude of these transfers to the consumer is apparently small enough to suggest that, for the reasons stated above, the effect, if any, is in fact negligible.

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[9] See (16) for the Colombian case and Black and Kelejian for the United States.

Finally, we consider here the alternatives to special-purpose taxes used in some countries: the direct levy on trainee workers (Venezuela) and the levy on machinery imports (Ecuador). The second makes sense to the extent that trained workers are substitutes for and not complementary to machinery. The levy on trainees makes sense to the extent that they benefit from their courses much more than the rest of society, which would occur if the supply of them were very inelastic. Neither of the two propositions is very arguable; the one because modern machinery quite reasonably appears to complement skilled labor; and the other because vocational training systems enlarge the supply of skilled workers and make it more elastic. They thus make it possible for productivity gains to be passed on to society at large while allowing a very small proportion of those gains to be appropriated by the worker in the form of higher wages.

D. IMPACT ON THE LABOR MARKET

As previously stated, in countries that have undergone considerable economic development in general, and of the secondary sector in particular, there has also been a considerable development of the vocational training systems. Exceptions are Mexico and Nicaragua, whose vocational training institutions fall short of what could be expected in this regard, and, to a lesser extent, Colombia, where the rate of development of SENA has been one of the highest in the region. On the whole, it is difficult to determine the specific impact of certain partial programs on economic development, but acceptable conjectures can always be made by observing the variations that occur in relevant indicators both over time and between countries. Vocational training systems may be an answer to the problem of meeting felt needs of the development process, as in countries such as Uruguay and Argentina, which as early as 1955 had attained coverage levels of 1% a year of the labor force (see Chart X-1). Other high-coverage countries—Brazil, Colombia and Venezuela from the sixties and Costa Rica and Panama in this decade—appear rather to be anticipating the development processes and thereby reinforcing the growth of their vocational training institutions. The ratio of graduates by sector to which the courses apply to labor force by sector, and a similar indicator with the course-hours per sector in the numerator (Table X-10), point in the same direction, and it is everywhere observable that the trend is toward the training of labor for the secondary sector, which is the basis for sound development. Other similar available indicators are no more helpful in shedding light on the subject.

Thus information must be sought on specific courses of study, since the existing data on the labor force in the different countries do not identify the graduates of vocational training. In this regard, evaluations made for SENA and SENAI show, in general: (1) a high return on vocational training when its graduates are compared with persons of similar formal education and experience, (2) not very great advantages when the comparison is with persons in similar occupations, and (3) a relative stability and adequate occupational correspondence for courses of one year or more, and less so for shorter courses. The first conclusion is based on the studies by Puryear and Maldonado, which show, in the case of SENA, social and private rates of return of between 15% and 120% a year on the investment, and the work of Castro and Mello e Souza which show social rates of return of between 22% and 120% on SENAI training in Sao Paulo. A similar result was obtained by the study of Kugler, Reyes, and Gomez, in which it was found that persons taking non-formal education courses (including SENA courses) earned an average of 20% more than persons who did not, but had similar levels of formal education and experience. This effect was independent of the duration of the non-formal courses, and was obtained when those who had taken them entered the modern sectors of the economy. The second conclusion is reasonable in that vocational training is only one training alternative, another one at least equally important being in-service training. Even so, Pastore and Assis found that, in a group of lathe operators in Sao Paulo, SENAI graduates were "upwardly mobile" and earned slightly more than the others. The studies mentioned show that the rates of return gradually decline as the control group used for comparison becomes more homogeneous. The third conclusion—occupation stability—is found to vary widely in the different studies: Castro, Pereira, and Furtado cite a high turnover for SENAI graduates in Guanabara, but make light of the phenomenon. SENA's evaluations show a 64.2% correspondence between training and employment for short courses in bookkeeping, and for a series of short courses in certain farm operations they noted that 76.1% of the graduates had been employed at one time or another in the specific work covered in the course but that, because of the seasonal nature of this work, at the time of the interview only 21.7% were employed in the specific occupation and 62.8% were in other agricultural pursuits. There are two other SENA evaluations of its long (apprenticeship) courses, one on graduates from the period 1963-66 states that 72% of those with jobs were employed in the trade studied and 11.6% in related trades; 8.7% of the total were inactive, and 15.4% unemployed, a rate that was slightly below the average around the date of publication. The findings of the other study, for the period 1966-69, were very similar.

In the light of these results, it is worth while asking whether a turnover of 50% is high or rather whether a correspondence of 50% is high. Under the extreme assumption that those who do not stay in the trade for which they were trained have lost their investment altogether, the rates of return mentioned above are cut by one half, and all costs are imputed to those who do stay; however, the returns are still high enough to justify the investment. Obviously, it is much more reasonable to assume that some positive trace of the courses remains both in those who do not join the labor force and in those who switch occupations.

E. CONCLUSIONS

In general terms, Latin America has been innovative in its organization and financing of the training of its working class over the last 25 years and in the education technologies employed for the purpose. In the countries where the school system is the most advanced and the average level of schooling is highest, as in Argentina and Uruguay, the vocational training system has been integrated the most into the formal education system. In the other countries, however, the kind of instruction that has been established differs widely from the traditional kind, which usually requires relatively high levels of formal education to be able to transmit the knowledge and skills required to operate the modern industrial technology and other processes associated with the organization and control of a modern society. Institutions such as SENAI and SENA appear to be producing a modern industrial proletariat that possesses all the skills and knowledge required to operate the most advanced technologies.

In almost all the countries of Latin America the educational levels of industrial workers are heavily clustered around 4 to 6 years of formal schooling, and it is precisely at these levels of educational attainment that vocational training programs take up the young people (14 to 18 years old) who leave the school system *en masse*. The immediate personal return apparently offered by these courses, which are usually very short (3 months to a year), is generating a great demand for this kind of training; though it covers a relatively small proportion of the school-age population (between 5% and 15% of the population between 15 and 19 years of age in the countries where vocational training systems are most highly developed), the proportion covered constitutes a sizable fraction of the young people that become part of the industrial proletariat.

From the financial standpoint, the payroll tax has been an innovation characteristic of vocational training programs in Latin America, since it was first introduced in Brazil with the establishment of SENAI in 1942. The system has apparently worked sufficiently well to permit the creation and growth of a kind of training for the working class that is a workable alternative: (1) to more traditional systems of technical instruction within the school system, which seem to have entered the throes of crisis, and (2) to in-service training which, given the average size of industrial establishments in Latin America, would not appear to be the most efficient way to train the new generations of workers. In this regard vocational training institutes are able to operate at levels of activity that afford substantial economies of scale. At the same time, the possible distortions and redistributive effects associated with this form of financing do not appear to exert a very significant impact on resource allocation or on income distribution, and the total amount of resources used by this kind of training is not very great compared with the amount spent on the school system.

On the whole, vocational training programs in Latin America appear to be operating at fairly high costs per student-hour when compared with the costs of technical education or, of course, with the costs of traditional academic education, which are much lower. This discussion of costs per student-hour, however, leads to two types of complementary considerations for the evaluation of vocational training programs as a strategy for increasing the supply of skilled labor in a developing country. These two problems are the duration of the training process in capital-poor countries and the social return on investments in processes of this type.

While the costs per student-hour are admittedly high, the relatively short duration of the courses and their high specificity demand an overall investment of time and other resources that is much smaller than that required by any known alternative in the formal education system. This, coupled with the possibility of a more rapid adjustment of the supply to the demand for labor on a market in process of change, if the courses are short, generates rates of return on the investment—in terms of the total duration of the instruction—that are relatively high and, in general, higher than those obtained from education processes that are more capital intensive.

Accordingly, in view of the demand for skilled labor associated with the acceleration of the economic development and industrialization processes, the countries of Latin America have found in the institutionalization of vocational training a device for making the supply of this labor much more elastic in the short run without having to make a very heavy capital investment or to allocate very substantial resources for its operation. On the one hand, this greater elasticity of the supply of skilled labor has permitted greater economic growth by preventing the emergence of certain bottlenecks and by raising individual productivity; and, on the other hand, it has put the brake on the growth of the wages of skilled workers wherever the numbers of such workers have in fact been greater, and has thus permitted a transfer of productivity gains to other sectors of the economy.

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STATISTICAL APPENDIX

Table X-1. Latin America: Enrollments in Vocational Training Courses, Selected Years 1955–75
(thousands)

Country	Institution	Year of Establishment	1955	1960	1965	1970	1972	1975
Argentina	CONET[1]	1959	83	99	123	148	170	207
Bolivia	FOMO	1972	—	—	—	—	.5	1.1
Brazil	SENAI	1942	45	85	127	273	310	434
Brazil	SENAC	1946	37	46	56	99	184	446
Chile	INACAP	[illegible]	—	—	12	32	31	39
Colombia	SENA	1957	—	12	33	268	325	327
Costa Rica	INA	1965	—	—	—	4.1	9.4	13.3
Ecuador	SECAP	1966	—	—	—	1.4	2.4	5.3
Guatemala	SENDAP-INTECAP	1972	—	—	—	5.4	7	14
Honduras	INFOP	1972	—	—	—	—	—	8.7
Mexico	ARMO-ICIA[2]	1965, 1975	—	—	—	—	7.4	19
Nicaragua	INA	1967	—	—	—	1.1	1.3	1.2
Panama	IFARHU[3]	1971	—	—	—	2.0	3.3	11
Paraguay	SNPP	1971	—	—	—	—	.8	2.7
Peru	SENATI	1961	—	—	5.3	23	24	22
Uruguay	UTU[1]	1942	10	19	27	36	35	38
Venezuela	INCE	1959	—	14	75	88	110	195

Source: CINTERFOR

[1] CONET and UTU figures include enrollments in technical schools.

[2] ICIA was established in 1975 and ARMO in 1965.

[3] IFARHU comes under the Ministry of Labor.

Table X-2. Ratios for Vocational Training Enrollments in Some Latin American Countries in 1975

Country	Annual population growth rate[1]	Enrollments in VT over:[2]	
		EAP (%)	Population 15–19 (%)
Argentina	1.5	2.1	9.3
Brazil	2.8	2.6	7.7
Colombia	2.7	4.3	11.5
Uruguay	.7	3.2	14.4
Venezuela	3.1	5.4	13.9

Sources: [1] United Nations. Demographic Yearbook, 1960, 1975.
[2] Table X-1 and ILO projections (op. cit.).

Table X-3. Latin America: Some Indicators of Economic Development and Industrialization, 1960–1975

Country	Per capita GDP 1960	Secondary sector as % of total GDP in 1960	Annual growth rates 1960-75 (%)		
			GDP	Per capita GDP	VA secondary sector
Argentina	978	37.4	4.1	2.5	5.3
Uruguay	901	30.9	1.1	0.4	1.4
Chile	847	37.5	2.5	0.6	1.7
Venezuela	1072	48.6	5.9	2.2	6.6
Panama	585	20.9	7.0	3.8	7.9
Mexico	515	30.2	6.6	2.8	8.1
Costa Rica	510	19.7	6.0	2.9	8.2
Brazil	416	30.3	7.1	4.2	7.5
Peru	414	35.9	5.5	2.4	7.3
Guatemala	410	15.8	5.5	2.8	6.4
Nicaragua	382	20.3	6.5	3.5	9.7
Salvador	321	18.7	5.4	1.8	7.1
Colombia	311	25.1	5.6	2.7	6.2
Honduras	281	20.9	4.0	1.8	4.4
Paraguay	278	19.3	5.0	2.0	5.2
Ecuador	246	22.9	6.9	3.8	8.1
Bolivia	190	27.6	5.3	2.7	6.4

Source: OAS. América [illegible]fras
VA: Value added

Table X-4. Latin America: Some Indicators of the Development of Education, 1960–1975

	Country	% of illiterate urban population 15–19 years old in 1960	Primary enrollment in population 5–14 years old		Secondary enrollment in population 15–19 years old		Enrollment in technical education as %age of total secondary enrollment	
			1960	1975	1960	1975	1960	1975
	Argentina	—	.71	.81	.42	.90	.59	.38
I	Uruguay	1.5	.80	.72	.45	.74	.24	.20
	Chile	4.4	.67	.88	.32	.47	.30	.40
	Panama	4.0	.59	.75	.39	.40	.33	.30
	Costa Rica	3.6	.54	.65	.25	.52	.16	.16
	Venezuela	—	.59	.67	.22	.55	.31	—
II	Peru	—	.54	.77	.20	.55	.20	.27
	Ecuador	7.5	.52	.56	.14	.35	.35	.26
	Colombia	8.6	.33	.55	.14	.55	.38	.13
	Brazil	—	.41	.50	.15	.55	.22	.12
	Paraguay	11.3	.60	.60	.10	.25	.28	.012
	Bolivia	—	—	.63	.14	.22	.11	.05
	El Salvador	21.0	.45	.68	.13	—	.31	—
III	Mexico	15.3	.48	.65	.09	.36	.35	.03
	Honduras	10.2	.40	.55	.08	.21	.39	.20
	Nicaragua	—	.30	.46	.06	.22	.33	.10
	Guatemala	37.9	.26	.40	.07	—	.11	.05

Source: OAS. América en Cifras.

Table X-5. Latin America: Costs of Vocational Training Institutions in 1975 (US$ thousands)

			Type of Cost		
Country	Institution	Total Cost (%)	Operating	Investment	Debt Service
Argentina	CONET	100,866 (100)	86,548 (86)	14,056 (14)	43 (.04)
Bolivia	FOMO	305 (100)	215 (70)	91 (30)	0
Brazil	SENAC	25,534 (100)	20,300 (80)	80 (.3)	5,162 (20)
Brazil	SENAI	90,681 (100)	69,370 (77)	21,311 (23)	0
Chile	INACAP	1,984 (100)	1,923 (97)	61 (3)	0
Colombia	SENA	28,977 (100)	23,234 (80)	5,424 (19)	318 (1.1)
Costa Rica	INA	3,592 (100)	2,973 (83)	581 [illegible]	38 (1)
Ecuador	SECAP	2,016 (100)	1,589 (79)	427 (21)	0
Guatemala	INTECAP	2,087 (100)	2,041 (98)	46 (2)	0
Honduras	INFOP	2,857 (100)	1,954 (69)	785 (27)	118 (4)
Mexico	ARMO	2,398 (100)	1,814 (76)	263 (11)	0
Nicaragua	INA	1,880 (100)	1,820 (97)	60 (3)	0
Panama	Mintrabajo	1,652 (100)	1,652 (100)	0	0
Paraguay	SNPP	663 (100)	451 (68)	212 (32)	0
Peru	SENATI	6,255 (100)	4,297 (69)	1,958 (31)	0
Uruguay	UTU	7,017 (100)	6,781 (97)	237 (3)	0
Venezuela	INCE	[illegible]653 (100)	58,758 (84)	7,702 (11)	3,194 (5)
Total		**348,217** (100)	**285,720** (82)	**53,294** (15)	**8,873** (3)

Source: CINTERFOR

Table X-6. Latin America: Levels of Activity in Vocational Training Programs, 1975

Country	Institution	1 Enrollment (thousands)	2 Number of courses initiated	3 Total course-hours (thousands)	4 (3) × (5) Total student-hours (thousands)	5 (1)/(2) Students, course	6 (3)/(2) = (4)/(1) Course-hours[c]
Argentina	CONET	207	7,009	8,972.3	264,683	29.5	1,280
Bolivia	FOMO	1.1	85	28.7	370	12.9	338
Brazil	SENAC	446	—	1,553.2[a]	—	—	—
Brazil	SENAI	434	—	—	94,366[b]	—	217[d]
Chile	INACAP	38	3,166	528.2	6,497	12.3	167
Colombia	SENA	327	9,858	2,798	92,894	33.2	284
Costa Rica	INA	13.3	637	160	3,344	20.9	251
Ecuador	SECAP	5.3	360	53.3	784	14.7	148
Guatemala	INTECAP	14.2	555	52.3	1,339	25.6	94
Honduras	INFCP	8.7	586	34.2	506	14.8	[illegible]
Mexico	ARMO	18.5	1,411	35.3	462	13.1	25
Nicaragua	INA	1.2	71	10.8	183	16.9	152
Panama	Labor Ministry	11.0	872	71.6	902	12.6	82
Paraguay	SNPP	2.7	134	60.3	1,212	20.1	450
Peru	SENATI	22.0	1,412	282.9	4413	15.6	200
Uruguay	UTU	38.0	—	—	—	—	—
Venezuela	INCE	195.0	16,114	2,633.4	20,569	7.8	163
Total		**1808.0**					

Source: CINTERFOR

[a] Instructor-hours (thousands)

[b] Reported figure

[c] Course-hours are equivalent to student-hours if each student takes only one course

[d] Student-hours

Table X-7. Latin America: Operating Cost/Student at Vocational Training Institutions in 1975
(US$)

			Expenditure		
		Total	Teaching C.	Admin. C.	Other O.C.
Country	Institution	O.C./student	Student	Student	Student
Argentina	CONET	418	393	13	12
Bolivia	FOMO	191	48	84	59
Brazil	SENAC	46	16	13	17
Brazil	SENAI	160	64	16	80
Chile	INACAP	49	21	19	9
Colombia	SENA	71	40	10	21
Costa Rica	INA	223	76	76	71
Ecuador	SECAP	300	114	36	150
Guatemala	INTECAP	44	55	37	86
Honduras	INFOP	[illegible]	27	47	152
Mexico	ARMO	90	13	44	33
Nicaragua	INA	892	9	277	607
Panama	Ministry of Labor	148	30	74	44
Paraguay	SNPP	163	55	15	93
Peru	SENATI	195	55	76	64
Uruguay	UTU	149	70	42	37
Venezuela	INCE	281	191		90
ALL		158			

Source: Tables X-5 and X-6 and CINTERFOR.

Table X-8. Latin America: Operating Cost of Vocational Training Programs Relative to Their Operating Levels, 1975
(US$)

Country	Institution	O.C./Student	O.C./Course	O.C./Course-hour	O.C./Student-hour
Argentina	CONET	418	12,350	9.65	.33
Bolivia	FOMO	191	2,529	7.49	.58
Brazil	SENAC	46	—	13.07*	—
Brazil	SENAI	160	—	—	.73
Chile	INACAP	49	607	3.64	.30
Colombia	SENA	71	2,357	8.30	.25
Costa Rica	INA	223	4,667	18.58	.89
Ecuador	SECAP	300	4,414	29.81	2.03
Guatemala	INTECAP	144	3,677	39.02	1.52
Honduras	INFOP	244	3,334	57.13	3.86
Mexico	ARMO	90	1,286	51.39	3.92
Nicaragua	INA	892	25,634	168.52	9.94
Panama	Ministry of Labor	148	1,894	23.07	1.83
Paraguay	SNPP	163	3,306	7.48	.37
Peru	SENATI	195	3,043	15.19	.97
Uruguay	UTU	149	—	—	—
Venezuela	INCE	281	3,646	22.31	2.86
Total		**158**			

Source: Table X-5 and CINTERFOR.
*Operating cost per instructor-hour.

Table X-9. Latin America: Sources of Financing of Vocational Training Institutions, 1975[1]

Country	Institution	Year Est'd.	Public Budget	External Assistance	Payroll Tax Rate (%)					Other Sources
					Government	Industry	Services	Agriculture	Tax Base[2]	
Argentina	CONET	1959	Yes	—	—	1.0	—	—	All	—
Bolivia	FOMO	1972	Yes	Yes	—	—	—	—	—	Yes[3]
Brazil	SENAI	1942	—	—	—	1.0	—	—	All[4]	—
Brazil	SENAC	1946	—	—	—	—	1.0	—	All	Yes[5]
Chile	INACAP	1966	Yes[7]	—	—	—	—	—	—	Yes[8]
Colombia	SENA	1957	—	—	.5	2.0	2.0	2.0	10+[6]	—
Costa Rica	INA	1965	—	—	—	1.0	1.0	1.0	5+[6]	—
Ecuador	SECAP	1966	Yes	—	—	.5	.5	—	All	Yes[9]
Guatemala	INTECAP	1972	Yes	—	—	.5	.5	.5	5+[10]	—
Honduras	INFOP	1972	—	—	.5	1.0	1.0	1.0	5+[6]	—
Mexico	ARMO	1965	Yes	Yes[11]	—	—	—	—	—	—
Nicaragua	INA	1967	Yes	Yes	—	—	—	—	—	—
Panama	Labor Min.	1965	Yes	—	—	—	—	—	—	—
Paraguay	SNPP	1971	Yes	—	—	1.0	1.0	1.0	All	—
Peru	SENATI	1961	—	—	—	1.5	—	—	15+	—
Uruguay	UTU	1942	Yes	—	—	—	—	—	—	—
Venezuela	INCE	1959	Yes[12]	—	—	2.0	2.0	2.0	5+	Yes[13]

Source: CINTERFOR—Comparative table and fact sheets on vocational training institutions in Latin America, 1976.

[1] Covers only sources accounting for more than 2½% of the total budget of the institution.

[2] Refers to the minimum number of workers that an enterprise must have in its employ to be subject to the payroll tax.

[3] Income of business entities; was 6% of the total in 1975.

[4] There is a 0.2% surtax on industrial firms employing more than 500 workers.

[5] Income of trainee workers; was 10.8% of the total in 1975.

[6] Autonomous institutes and state enterprises are taxed as private firms.

[7] Through the budget of the Development Corporation (CORFO).

[8] Contributions of trainee workers; was 19.7% of the total in 1975.

[9] A 2% levy on machinery imports.

[10] In the agricultural sector the tax is paid by firms with 10 or more workers.

[11] 38% of the budget in 1965–1972 (UN).

[12] 20% of the payroll tax.

[13] 0.5% of the wages paid to trainee workers.

Table X-10. Latin America: Graduates (1974) and Course-Hours (1975) by Economically Active Population (EAP) in Each Sector, 1975[1]

Country	Institution	Primary sector		Secondary sector		Tertiary sector	
		Grad's/ EAP %	Course-hrs/EAP %	Grad's/ EAP %	Course-hrs/EAP %	Grad's/ EAP %	Course-hrs/EAP %
Brazil	SENAI			4.5			
Brazil	SENAC					2.8	13.7
Chile	INACAP	1.3	14.5	2.3	62.0	.4	5.2
Colombia	SENA	3.9	25.3	7.5	101.0	5.3	37.0
Costa Rica	INA	.7	10.2	2.6	114.0	1.5	2.9
Guatemala	INTECAP	1.0	2.0	1.0	6.9	1.0	3.8
Honduras	INFOP	.1	2.8	1.0	11.4	.2	4.2
Nicaragua	INA	—	.2	1.0	11.4	.1	.4
Panama	Ministry of Labor	2.0	8.5	7.0	58.0	1.0	6.2
Paraguay	SNPP	.4	10.0	.5	14.5	.1	1.4
Peru	SENATI	—	—	3.0	40.9	—	.8
Venezuela	INCE	.3		3.0		2.0	

Source: Figures based on CINTERFOR data (Fact Sheet No. 6), and on comparative and descriptive Tables and data from OAS. América en Cifras.

[1] Excludes institutions for which data were unavailable; a blank space was left for figures not available.

CHAPTER XI

Alternative Policies for Financing Higher Education

Edgardo Boeninger Kausel[1]

A. PRELIMINARY CONSIDERATIONS

1. The recent debate regarding the public financing of higher education

Education, which is undoubtedly one of the major issues of our time, has in recent decades been the subject of a curious mix of consensus and controversy. Few fields of human activity have awakened so many hopes of progress towards a "better society." The frustration, when reality doesn't meet expectations, can also be very acute. With the passage of time, interest and controversy have increasingly focused on higher education, which is viewed as the fulcrum of this powerful lever of progress.

Development of the individual and realization of his potentialities, enrichment and widespread diffusion of culture, social equality and integration are some of the themes of humanists that see in education an instrument so central that it becomes to some extent an end in itself. Higher personal income, higher productivity, technological progress, greater equality of material opportunities and, as a consequence, accelerated economic growth and better income distribution are the alleged effects of education to which economists and politicians point.

All this has led to its continuing to be assigned high priority in the national allocation of resources. It is also pointed out that higher education in particular performs the essential function of discovering and selecting the most capable individuals, as well as of developing the potentialities of each.

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The contribution of education to one or the other of these social goals has been the subject of varying judgments and estimates over time. Apart from successive and different "vogues," it may be stated, specifically as regards higher education, that the current state of knowledge on the subject does not permit the formulation of categorical conclusions. It is generally acknowledged that it is or can be a positive factor in the achievement of the foregoing goals. Given the nature of those goals, it is also agreed that higher education benefits both the individuals that receive it and society as a whole, even though there is no agreement about the relative magnitude of those effects.

From another point of view, education is considered to be both a consumption and an investment: consumption in that education provides satisfactions of various kinds to the student as well as to his family and because educational expenses are considered a normal part of the family budget, which is usually true in Latin America, even for higher education. Likewise, the State's contribution comes from the current fiscal budget. Nevertheless, education is undoubtedly also an investment, in that, for the individual, it implies higher earnings in the future and, for society, an accumulation of "human capital." Likewise, by the lower and middle classes, higher education is considered a safety factor (substitute for the physical or financial capital they lack) that reduces the risk or uncertainty of the future and is a guarantee against unemployment or sharp variations in income. Lastly, as access to a specified level of education becomes more general, completion of that level becomes imperative, for those who do not do so, face the certain danger of descending in the social scale. In the relatively more developed countries of the region, this holds true for secondary education for the middle class, while it seems to hold true generally for primary education.

Specifically, higher education is mainly used by the middle classes in the social processes of confrontation and competition as their favorite means of upward social mobility. These classes exert pressure for greater access to higher education, which they use to offset the influence of money, property, social connections, organization, and the like, which other groups in society have more of.

Apart from analytical considerations, the fact is that the social demand for higher education has continued to grow very rapidly in Latin America. This is so even though there are signs that the job market for occupations that call for university studies is becoming glutted and that overqualification and underemployment are on the increase. This process has led to a profound questioning of the once prevalent assumptions of a lack of human resources at the professional level and of the high rate of return on higher education. Nevertheless, it has not affected the "propensity to study more" that is reflected in a continuous increase in the demand for education in all social strata. If we bear in mind that, in any event, the university-trained professional is rarely unemployed, because overqualification implies that the more educated displace the less educated from less demanding jobs, it is not difficult to understand why, for most people, the above-mentioned positive factors prevail.

The facts reflect this widespread social attitude. Latin American countries spend between 15% and 20% of the public budget on education, which means that between 3% and 5% of the gross national product (GNP) is assigned to it.

In the last two decades, these figures have increased sharply; public expenditure on education has risen by about 11% annually while the average annual rate of GNP growth has been about 9%. On the other hand, school enrollment has grown by more than 6% annually, while the corresponding rate for the population under 24 years old is only 3%.

For higher education, the pace of growth has been substantially faster than for education as a whole. Furthermore, although higher education accounts for only 4-5% of the total enrollment in the educational system, it consumes a much larger share of the resources, in some countries up to 40% of public expenditure on education. This phenomenon appears to have become accentuated in recent years.

In spite of the acute social pressure that exists, the foregoing figures, together with the doubts that have arisen about the real social benefits of higher education, have inevitably led to a situation in which it is increasingly difficult to justify the additional allocation of public funds to Latin American universities.

The requests made must compete with other priorities in the educational field: the educational sector as a whole no longer seems to have a clear priority over other activities and investments. To cite only problems that arise in the field of education, it is increasingly and more forcefully argued that, from the standpoint of equity and efficiency, it may be more advisable to concentrate efforts on pre-school education and on rural education at the primary and/or secondary levels.

Consequently, the conviction is spreading among government authorities, planners, and economists that it is no longer possible to continue to increase public expenditure on higher education, and even proposals for transferring the greater part of the respective cost to students and their families are gaining support.

In short, the discussion of the *who, how much, how* and *when* of the financing of higher education and the corresponding distribution of the costs among individuals, social sectors, and the State is raging as never before. It is taking place in a context in which the policy for financing higher education is called upon to be an appropriate instrument for achieving the objectives of efficiency and equity, which, from a macro-economic perspective, means that education is required to be an agent both of growth and of income redistribution and faces the challenge of achieving the best possible reconciliation between the two objectives. It also means that the problem of financing higher education is, at the same time, one of allocating resources at the global level of society, defining objectives and priorities between various levels and forms of education, and of reconciling specific methods of financing that have individual and social objectives, both economic and non-economic. It further follows that the specific methods of financing higher education interest and affect many different social agents, including Government authorities, students and their families, taxpayers in general, university professors, and professional associations. These agents have different points of view, interests that are often opposed, and varying levels of information and understanding of the problems concerned; all of which shows that we face an eminently political problem.

This reflection only strengthens the need to try to define and, as far as possible, measure the social and individual costs and benefits of higher education, and to gain as accurate a view as possible of aspects that are only susceptible of qualitative appraisal. Only in this way can the debate and the political decision reach a satisfactory degree of rationality.

2. The principal functions of institutions of higher education

The analysis and formulation of policies on the subject under discussion becomes more difficult because of the variety of roles played by Latin American universities, the institutions in which the function of higher level teaching is almost exclusively performed.

Indeed, universities do not limit their role to the transmission of the cultural heritage of man through the educational task inherent in their teaching function. In the first place, universities in Latin America are undoubtedly the backbone of the scientific and technological system, since a large share of the scientists as well as of the equipment, facilities, and financial resources for research are concentrated there. Furthermore, there is a close relationship between the educational role and creative efforts in the field of research. In sum, the universities bear a preponderant responsibility for keeping the countries abreast of advances in world knowledge, endowing them with some degree of creative capacity of their own, and of contributing—albeit on a modest scale—to the enrichment of the contemporary cultural stock.

The university is also called upon to assist in the diffusion of culture through its extension or social communication function, to be the center of intellectual debate and social criticism, and even to assume, at least subsidiarily and in its area of competence, the responsibility of contributing to economic and social development through applied research and the provision of services. From another angle, it is the duty of the university to contribute to the personal development of its students and to help them define and develop both their individual vocations and their own social roles.

These tasks, as well as the basic inspiration of the function of the university, which is reflected in the continuing search for knowledge and truth and the untrammeled cultivation of intelligence and reason, have important consequences for the operation of universities; some of them are relevant to the subject of this paper. This brings up the very controversial matter of university autonomy, which, although it must be expressed fundamentally in the concept of academic and administrative independence, can only be effectively realized if the minimal conditions of financial independence and security also exist. Because of this, methods of financing higher education are often judged in terms of their impact on university autonomy, and that further increases the influence of political factors in the decision-making process.

From a strictly financial and cost point of view, the problem of research is of greater relative importance. Scientific activity, at least the basic sciences, does not produce goods for which there is a market demand. At the same time, scientific knowledge cannot be individually appropriated; it is not "consumed" by use since its existence is definitive and remains at everyone's disposal as a public good. Consequently, its value for a particular user would in any case be much inferior to its social value. This being so, the financing of scientific research falls mainly on the public treasury. Only applied research can be partially self-financed, particularly in the fields of agriculture, engineering, economic, business administration, food technology, and other areas directly linked to economic and social development. This is not so for mathematics, physics, biology, chemistry, history, philosphy, anthropology, theory of art, literature, classical languages, and many other disciplines.

As is well known, in recent years a number of international reports and studies have emphasized the need for the countries to assign a larger share of resources to scientific and technological research and have set 1% of GNP as a target, a percentage Latin American countries are still far from reaching.

From the perspective of the financing of higher education, the importance of this problem lies in the close relationship that exists between teaching and research, since the same university professors perform both functions in the course of their daily work for a single flat salary. It is furthermore argued—and this point of view is vigorously defended by university professors—that research is a complementary and supporting activity that is necessary for the proper performance of the teaching function. Accordingly, it is not easy to separate the respective costs and to determine what proportion of total university expenditure and of that for operating specific units is for research and how much is for higher education. In this sense, there is no agreement on how to measure the results of scientific activity, nor are there clear criteria concerning the resources necessary for carrying it out.

In any case and for the purposes of this paper, higher education financing policy is understood exclusively to mean how to cover the costs of the teaching function. According to some estimates (11) it can be assumed, solely in order to establish orders of magnitude and to make some arithmetical calculations, that—on average—about 50% of the operating expenses of universities are for higher education, and the other 50% for the other university functions. This assumption must, in any case, be qualified when the university is mainly financed through the payment of fees, as will be seen later on. Finally, it should be noted that any significant change in the assumptions about the distribution of costs between teaching and research substantially alters the magnitude of the problem of financing higher education.

3. Objectives of a policy for financing higher education

It follows from what has already been said that a policy for financing higher education pursues several objectives; they might be summarized as follows:

a. To reduce the contribution of the State to the financing of university education or at least to prevent public expenditure on higher education from expanding. The many social needs and pressures that prevail in an era marked by an explosion of aspirations and growing social participation has produced fierce competition for fiscal resources, the relative scarcity of which is becoming increasingly more evident, even though they have increased considerably in almost all countries.

b. To maximize the social rate of return on education outlays according to some criterion or set of evaluation mechanisms that will ensure more appropriate allocation of resources to education as a whole and among its various levels and forms. This objective means that education must make an effective contribution to the goal of achieving the highest possible rate of economic growth.

c. To create conditions conducive to real equality of opportunity in access to higher education and a positive redistribution of income in favor of the underprivileged sectors of society.

d. To increase efficiency in the internal use of resources by institutions of higher education. There is a lack of suitable planning and evaluation instruments in these institutions as well as of any form of competitive market that could operate to promote better use of resources. Consequently, it is believed that, by and large, universities are responsible for considerable waste and that their costs are excessive per unit of result.

Of course, the relative emphasis on any one of these objectives varies according to the short-term situation, prevailing ideology, and the economico-social pattern in each country. Thus, for example, Chile has been primarily endeavoring to solve an acute problem of fiscal deficit and grants overall priority to the reduction of public expenditure. In Colombia, the primary concern is with equality of opportunity, given the unequal access to education by different sectors of the population. In contrast, in Costa Rica none of the abovementioned factors is critical and consequently it is only logical to expect that there will be greater interest in university efficiency. Finally, Bolivia is at a stage where it can be assumed that considerable pressure to expand the education system, especially at the primary and secondary levels, will continue to make itself felt.

B. BASES FOR THE ANALYSIS OF ALTERNATIVE POLICIES FOR FINANCING HIGHER EDUCATION

1. Methods of evaluating financing policies

The alternative methods of financing higher education must be evaluated against the objectives and functions that have been stated. Accordingly, this paper will endeavor to consider three different approaches that are not mutually exclusive but rather complementary, since they try to answer questions that, while different, are equally valid.

a. External efficiency

External efficiency is understood to mean the relationships between higher education and higher education institutions and the environment in which they operate. In short, it is held that a specified policy for financing higher education must be judged, among other things, in relation to the following aspects:

i. Total availability of resources for its application.

ii. Its social and private rates of return and the difference between them.

iii. Level of satisfaction of the social demand for higher education.

iv. Method of incorporating university graduates into the labor market, with particular emphasis on the supply of professionals—demand for qualified manpower—employment opportunities relationship.

b. Equity

In the second place it is necessary to consider financing policies from the point of view of equity.

i. Equality of opportunity, whether the unit of analysis is the individual or significant sectors or strata of society.

ii. Changes in income distribution, present and future.

iii. Social mobility.

c. Internal efficiency

The third approach to evaluating post-secondary institutions involves the following factors:

i. Degree of utilization of human and material resources available.

ii. Cost per unit of "educational product."

iii. Productivity of the system in terms of attrition, repetition, and efficiency in the learning process, measured by the rate of graduation in relation to income and average effective duration of each university training course.

iv. Quality of higher education, in the broadest sense of the term, especially the uniformity or diversity in this regard of institutions of higher education.

v. Effect on how other university functions, especially scientific research, complement, and are reconciled with, teaching.

vi. Capacity and willingness to introduce technical innovations in the teaching and organizational field.

2. Elements of a financing policy

Every university financing policy consists of a set of elements that are present in different forms and to varying extents. For the purpose of this analysis it seems advisable to distinguish the following:

a. Financing mechanisms proper

They include the State contribution from the general revenue of the Treasury, earmarked taxes, direct payments by students in the form of fees and repayment of loans granted earlier (system of deferred payment). Another possibility is that of levying an additional tax on professionals according to the cost of education and the higher income they receive as a result of having pursued higher studies, which is by way of being a deferred payment. Of course, each of these alternatives or any combination of them has a different effect both on the internal and the external efficiency and on the equity of the system of higher education.

b. Types of subsidy contemplated by the financing policy

The direct fiscal contribution to institutions of higher education that makes it unnecessary for them to charge fees is, of course, besides a method of financing, the most important form of subsidy. Another mechanism that is widely used is scholarships, which can cover only the cost of fees, including also the other direct costs of studying, or include the subsistence expenses of the student. In the latter case the opportunity costs are being partially financed; that is, the income forgone because the student is studying instead of entering the labor market.

Many others have preferred to provide students with food, lodging, and/or study materials free of charge or at a reduced cost. Preferential rates of interest charged on educational loans and any form of incomplete repayment of loans are also a form of subsidy. Finally, various types of personal income tax deductions or credits proportionate to the actual educational expenses incurred by the head of household have been used.

c. Methods of organizing studies and access to higher education

The effect of a specified financing policy on the efficiency and equity of a higher education system is influenced by a set of factors that are not financial instruments but which, because of their decisive nature, must be considered constituents of this policy. This involves aspects such as the existence or non-existence of part-time students and of afternoon or evening classes. Whether courses are short or long and whether or not they are considered terminal intermediate points formalized by some degree, title or diploma, have different effects on the objectives cited in terms of the financing methods adopted. Finally, the same might be said about the academic regulations selected, especially as regards the option between a rigid curriculum and a system of credits, as well as the rules governing the credit system if it is decided to apply it (minimum or maximum number of credits per academic period; annual, semi-annual, or quarterly promotion; repetition requirements, etc.).

The same applies to the mechanisms of selection for entry to higher education (grades from secondary education, aptitude tests, general knowledge tests, etc.) and to whether or not access to higher education is limited by fixing quotas for specified fields of study or for all courses. Systems of preferential access for applicants from certain regions of the country or graduates from a particular branch of secondary education have also been used.

In sum, the evaluation of a policy for financing higher education requires the analysis of the combined effect of all these elements on external efficiency, internal efficiency, and equity, defined as general objectives that any policy must contribute to in larger or smaller measure. The prevailing socio-political pattern will specify, in each particular case and moment, the relative importance of each one of these objectives, as well as their exact definition and scope. What we have attempted to indicate here is that we are in the presence of a matrix in which ends as well as means are multiple and that their analysis involves quantitative data, objective facts, elements that are susceptible only of qualitative appraisal, and, finally, value judgments of varied inspiration.

3. External efficiency: instruments for achieving an optimum allocation of resources

Accordingly, efficiency in the allocation of resources has been acquiring increasing importance in the debate. A first analytical approach is a comparison of social and private costs and benefits. Recognition of the existence of external economies or social benefits in higher education, additional to and different from the private benefits of the students (greater productivity of the economy, comprehensive cultural and social cohesion, etc.) leads to the conclusion that, from the economic point of view, the cost of education should be shared between the benefited individual and society. Limited computation possibilities have so far prevented an agreement about the proportion in which the costs should be divided between the individual beneficiary and the State. Those who insist that the financing should be mainly public give a greater relative value to external economies, while those who emphasize the immediate or deferred contribution of students are skeptical about their real importance.

Efforts have been made to solve the problem of the overall allocation of resources for higher education on the basis of the concept of rate of return. Society should increase or decrease the resources allocated for this purpose according to whether their social rate of return exceeds or is lower than that of alternative investments. This approach is, without doubt, valid, but, despite its theoretical merit, it is of little practical importance because of the existence of serious methodological limitations that prevent a sufficient quantification and restrict the possibilities of interpretation and correct use of the results. Furthermore, the rate of return is essentially an instrument for a limited decision between alternatives rather than for the solution of problems of overall allocation of resources.

In any event, the pertinent studies tend to indicate that, compared with the primary and secondary levels, there has been an excessive investment in higher education.

As a rule, the private rate of return is higher than the social one because the investment is financed mainly by the State and not by the individual. Furthermore, the additional taxes that the educated individual subsequently pays do not compensate for such transfers. This subsidy may be justified in part by the external economies or by equity considerations.

Within certain limits, determined by the equity factor that will be analyzed later on and by the inevitable vagueness, doubts, and omissions that surround the calculation itself, it can be argued that the policy of financing higher education should seek to bring the social and private rates of return closer together by increasing the private costs and/or reducing the private benefits. This observation supports the present tendency to try to get students to finance a larger proportion of the total cost.

The concept of rate of return is, without doubt, a useful instrument for the formulation of a policy for financing higher education, provided it is recognized that it is an auxiliary tool that provides information that can be helpful in making decisions but does not determine them. In effect, this method has the following limitations among others:

a. The already mentioned existence of non-economic benefits that it is impossible to quantify. This means that, in any case, the cost-benefit analysis must be complemented by the use of the cost-effectiveness method that tries to present alternatives in terms of the achievement, by unit of cost, of a set of objectives that are properly defined and ranked. These objectives may or not be economic, and may or not be susceptible of quantification.

b. The calculations that can be made usually do not take equity factors like income distribution and equality of opportunity into account.

c. The benefits obtained by the individuals educated are compared with those obtained by society as a whole, without considering what happens to those who do not receive an education. In other words, the rate of return for an individual does not reflect the benefit for the group or social stratum to which he belongs, because, to determine this, it would be necessary to consider the universe of individuals belonging to each stratum and to add up the benefits and contributions that affect each one of them. Thus, for any assessment from the point of view of social equity, the proportion of persons of each group that have access to the respective level of education is decisive. (This observation also applies to primary and basic education).

d. A difficulty in comparing benefits and costs is that the costs of education fall on one generation (taxpayers and families) while the benefits are received by the next generation.

It is also important to emphasize that a common characteristic of most of the secondary education systems is that they impart general education and do not prepare the student for any specific occupation. The absence of any specific qualification produces an abrupt discontinuity at the end of secondary education. In a more general way, those who have only primary education tend to be "laborers," while those who have secondary education (complete or incomplete, according to the degree of relative development of the country) tend to have a "lower middle class" status if they are unable to continue to the post-secondary level. Such social differentiation is usually accompanied by similar variations in income (1). This means that, unless the general structure of the educational system is substantially changed, the benefits of education will be fully received only by those who complete higher education. It is to be assumed that the same occurs with the contribution of education to the increase in the general productivity of the economy, and, consequently, with its effect on the rate of economic growth. A structural change designed to provide specific qualifications to graduates of primary and secondary education could--unless parallel cost increases occur—result in a greater social benefit per unit of investment in education and a similar increase in the private rate of return on primary and secondary education.

In short, the relationship between financing policy and efficient allocation of resources depends on the structure and characteristics of the educational system. If these vary, the above-mentioned relationship also changes, which only further complicates any analysis that claims to be broad.

4. Higher education and market competition

In view of the difficulties and limitations any technical instrument presents, the natural inclination is to give greater weight to the role of the market in the allocation of resources to higher education.

In this case the quantity and quality of education is established as a function of supply and demand. The payment is the entire responsibility of the user or consumer of education, and equilibrium occurs (assuming perfect competition) when the price is the same as the marginal benefit. This approach views the university as a firm that contracts resources for the production of educational services that are sold at a price that must cover their total cost, because, otherwise, the university enterprise would not continue operating.

Since the objective of such an educational enterprise would have to be the achievement of a maximum social benefit, a completely free market would have to be assured. The quality control of the system is provided by the market, in which the relative efficiency of the different universities and their adaptation to the structure of demand are rewarded and punished. There is thus a specific combination of prices and places that would shape the university structure more adequately to the "tastes" of the community. Assuming perfect competition, that structure would be socially efficient for the existing income distribution.

The justification of this method depends on the possibility of generating a sufficiently competitive market situation and on the existence of corrective mechanisms that make it possible to overcome the deficiencies it presents. In this respect it must be understood that a scheme of this type would make higher education a purely private sector operation, with all the consequences that implies (they will be discussed in the following paragraph).

The point of view put forward here is that the possibilities of the effective operation of a market system for higher education are limited in the sense that only with difficulty could it cover the bulk of education at that level and that its application represents costs that cannot be ignored.

In this regard, the following must be emphasized:

a. The assumptions of complete information, uniform rational behavior, and the mobility of productive resources that are inherent in a hypothesis of free competition are only partially valid in the educational field in developing countries such as Latin American countries. Of course, the information and behavior factors are probably biased in terms of the social origin of the student and his relatives. Furthermore, the mobility of productive resources is limited in the field of education.

b. The existence of external economies and non-economic benefits of education implies that a pure market system leads to a certain margin of underinvestment in education. To correct this, some subsidy to expenditure on higher education would have to be paid.

c. From the point of view of equity, "voting power" in the market due to the existing income distribution is assumed. To resolve this problem the potential users that require them would have to be provided with resources that supplement their purchasing power, which thus constitutes a subsidy built into the system. Alternatively, this subsidy could be granted to the institutions in proportion to the number of students they receive and their socioeconomic composition.

d. An important objective of a market scheme is to induce more efficient behavior by the universities, a fact that is not very clear, as will be seen in the following paragraph.

e. The educational market generates a process of "product differentiation" that tends to separate "good and expensive education for the elite" from "mediocre and low-cost education for the masses" through the segmentation of the market, which is characteristic of sectors of the economy in which the quality of the product can be invoked to achieve oligopolistic control of a captive clientele.

5. Internal efficiency: characteristics of and reasons for university behavior

In the first place, it should be pointed out that the criticism leveled at most of the universities seems to be fully justified. The fact is that, generally speaking, there is no cost consciousness, except in those institutions that are mainly financed by the payment of fees. In contrast, most of the proposals that come from the universities, whether a reduction in the teaching load, better equipment, or higher salaries, entail cost increases. In some countries, the work of a university teacher is usually organized around research, and the product of his work is judged by his peers according to standards established by the research workers themselves. The university teacher has no reason or incentive to teach a larger number of students or to introduce other forms of economy.

It has been rightly said that teaching is one of the activities that shows the slowest rate of technological innovation. This is due in part to genuine doubts about the advisability of using new technologies (for example, the much discussed problem of using mass communication media), but it is also due in good measure to the lack of pressure or incentives to address problems that distract the teachers from their preferred activities.

On the other hand, it must be understood that the university teacher belongs to a subculture that, in general, rejects the concept of economic competition and tenaciously resists being subject to it. This characteristic is not just an expression of antiquated traditionalism; it reflects, in good measure, a basic congruence between the values that prevail among teachers of higher education (and other levels of education) and the cultural essence of their activities. Of course, the fact that, to defend the status quo in this regard, they invoke with a reasonable degree of legitimacy the need to preserve academic independence—which itself is contingent upon the secure and unqualified nature of the financing—doesn't help to solve the problem.

The need to create conditions that make for more effective use of resources operates at two levels. On one hand, the higher and administrative authorities of the universities must be motivated; a reduction in the State's contribution and/or the obligation to finance a specified percentage of costs with income can have that effect. On the other, a similar effect must be produced on the behavior of the teachers; this might be done by establishing "special research funds" for whose allocation university teachers must compete through the presentation of projects. In such an arrangement, the general budget of the institution would only finance their salary, so that they could not continue to be full-time staff members if they didn't periodically obtain additional resources for research.

In any case, notwithstanding the urgent need to find incentives of this kind or others that induce cost reductions, there are some limitations on progress in this field that cannot be ignored.

In the first place, cost competition can lead to a real lowering of quality because of a reduction in educational services, overloading of the teacher's workday, excessive number of students per teacher, deficient laboratory equipment and libraries, etc. Situations of these types can be combined with the supply of high-price places in exclusive establishments. This makes for the segmentation of the market mentioned earlier. The result can be a more equitable social distribution of the payment for education in exchange for a greater inequality of incomes in the long run (differentiated rewards that favor graduates of first-rate universities) and of social divisiveness.

On the other hand, teaching and research functions are performed on an integrated basis and, in good measure, by the same individuals. An effective cost pressure, determined by a policy of financing teaching, can induce a reduction in or neglect of research, at least in those fields that require expensive facilities or entail high operating costs (surveys, for example) and cannot be sold in the market. This can in turn reduce the quality of the educational product. In this regard, it is to be noted that, for this reason, universities that are financed through fees tend to abandon research in the basic sciences. If such a system were applied to all universities, it would be essential to consider special transfer payments from the State to certain selected institutions to enable them to allocate part of the resources to such an essential purpose.

It is also usually argued that there are cases in which research is a more apparent than real function and that it masks underutilization of teachers, so that no significant loss would be produced if teachers were required to concentrate on teaching. Doubts in that regard would be largely dispelled if it were possible to assign resources separately to undergraduate teaching and to graduate research-teaching, areas which are much more clearly interrelated. For the rest, the assumption that research on a significant scale cannot be carried out in a university that does not have teachers capable of teaching graduate courses (a proposition that helps to establish criteria for the financing of specific institutions of higher education) is generally acceptable.

8. The problem of equity

Because of its nature, education has, of course, always been considered a particularly apt instrument for achieving greater equity in income distribution, equality of opportunity, and social mobility.

Reality seems to be rather disappointing. Most recent studies on the subject agree that the contribution of education to a better distribution of income has been meager and its contribution to greater equality of opportunity and real social leveling, weak. It therefore follows that, while the principle that access to higher education should not be determined by private "purchasing power" is correct, it is insufficient, and that free higher education has not been a effective means of achieving the desired objectives.

Clearly, better income distribution and greater equality of opportunity cannot be achieved through higher education if the less-favored sectors of the population are not subsidized. It is also a fact that, in most of the countries, subsidies to education have been very high and enduring. One of the reasons for their ineffectiveness in relation to the objectives stated here is that, as the available data show, the distribution of subsidies has not favored the lower income, underprivileged groups.

For example, Jallade states that in Colombia an analysis of the redistributive effect by levels shows that, in primary education, there is a transfer from the richest 13% to the poorest 87%, while, in secondary education, the redistribution is from the poorest 40% and the richest 13% to the urban lower middle class. On the other hand, for higher education, there is a net transfer from the poor and the very rich to the upper middle class. Complementing the previous study, a more recent study by Selowsky estimates that 60% of the subsidy to higher education in Colombia is received by the highest income quintile of the population (17). Similar studies in other countries have reached similar conclusions.

The regressive distribution of subsidies to higher education is a consequence of the unequal access of the different social strata to that educational level. All the known data confirm that this occurs to some extent both in developed countries and in Latin America. In the Latin American region, this phenomenon tends to be more acute because of the discriminatory process of selection that takes place at the primary and secondary levels. Few poor students complete secondary education. Thus, there is little that higher education *per se* can do about equality of opportunity. Of the countries that will be discussed below, only Costa Rica has achieved a substantial reduction in the bias in the proportion of individuals of each social group that complete secondary education, to the point that only the rural population is significantly under-represented among the candidates for university entrance.

In any event, a number of studies also prove that, even if only candidates for higher studies are considered, a new under-representation of the poorer sectors in actual access to the university occurs. There is normally a significant correlation between type of secondary school (quality of education received), rural origin, educational-occupational level of parents, and family income.

Thus, a recent study made in Chile shows that there is a significant correlation between the level of education of the father and the score obtained in the university entrance examination (known as the academic aptitude test) and between the type of secondary school attended and the same test (18). Scores of 600 points or more were obtained by 55.7% of the candidates whose parents had a university education, and by 32.2% of those whose parents had completed secondary education, as against only 16.4% of those whose parents had not gone beyond the primary level. In contrast, 60.3% of the last-mentioned group scored fewer than 500 points (which is likely to be set as the minimum score for entrance), compared with only 13.5% of the candidates who were children of university-trained professionals.

Similarly, 55.8% of the graduates of fee-paying private secondary schools obtained more than 600 points, while only 25.5% of the graduates of public secondary schools obtained that score. About 48.4% of these obtained scores lower than 500, as opposed to only 14% for the graduates of private secondary school (18). This is closely related to the fact that 86.8% of the children of parents that had not gone beyond the primary level were enrolled in public secondary schools, and only 6.6% in private fee-paying schools (18). For the children of parents with a university education, the percentages were 51.9% and 36.6%, respectively. These data clearly illustrate the phenomenon of the segmentation of the market that is emphasized in this document.

Although equality of access to primary education and, to a lesser extent, to the secondary education level has been increasing, it is no less true that this progress has been offset by the lengthening of higher education due to the accelerated development of graduate studies, to which only a minority of students belonging to the lower socio-economic groups have access. Apart from this, the investment per year of study is clearly increasing at the higher levels, so that an additional year of study for everyone would mean increasing inequalities in the amount of educational investment made.

On the other hand, the mere fact that higher education is free of charge is not sufficient to allow lower-income students to enter and remain in that level: they must also defray their own living expenses, and the "opportunity cost" or income forgone by them could be indispensable for their families.

In general, the effect of a financing policy on income distribution will be positive if those who can pay are actually charged all or part of the cost of their education. Furthermore, if there is to be greater equality of opportunity, appropriate subsidies must be granted to lower-income students.

There are many reasons that help explain the inequality of opportunity in access to the successive levels of education. Of course, it is not only the school that educates. As is well known, in this regard, the home and the environment also play an important role, which is perceptibly weaker in the case of the "poor." In this respect, it should be noted that the contents of formal education, as well as the teaching methods and the language used, are geared to the cultural characteristics of the middle and upper-income groups, which makes it relatively more difficult for the poorer groups to assimilate knowledge. Accordingly, the less favored strata require compensatory education in school if effective equality is to be achieved; this means that, contrary to what happens in practice, it is they who, from the pre-school level onwards, should receive better quality and higher-cost education. A policy for financing education that assigns priority to the problems of equity should try to achieve progress in this area.

From another angle, what is meant by equality of opportunity should be more accurately defined. It may be identified with the purpose of giving all the same "quantity" of education or a specified common minimum level. More acceptable theoretically is the idea that it means to enable every individual to develop his full potential, even though it has been proven that innate capacity is significantly correlated with social origin. At the same time a useful working definition for the purpose of this paper is to ensure equality of access to financing for study. This formulation is limited by the smaller propensity to risk and lower ability to look ahead of the lower income groups, which is reflected in their relatively less effective use of available financial resources.

This observation means that, in given situations, there can be no true equality of opportunity unless there is similar equality of results. Mention was made in the preceding paragraph of the problem of under-representation of lower-income groups in the universe of graduates from each educational level, a phenomenon that is more pronounced at the university and especially at the graduate level. Equality of opportunity will be effective only insofar as a participation proportional to the total number of members of each social stratum in the graduates of each educational level is achieved. Similarly, the level of remuneration for university graduates in the labor market should be the same, regardless of their social origin, which does not seem to occur in practice, as is shown by a study made in Sweden (1).

Finally, it must be emphasized that equity and efficiency in the allocation of resources for education are not fully compatible. This assertion is exemplified in the educational situation of women. The social and private rate of return is higher on the investment in the education of men because they obtain higher incomes throughout their working lives and, consequently, pay a larger amount of taxes. In contrast, access by women to the various educational levels is perceptibly lower, which means that to achieve a greater equality of opportunity they must be favored by educational policy. Furthermore, in this example, the rate of return does not take into consideration the significant educational role of women in the home, a role that can only be satisfactorily performed if they are properly prepared for it. In this regard a recent study of Bolivia concludes that "in general, the more education the mother has, the less the scholastic backwardness of the child and the higher his attainment." (16)

C. SOURCES OF FINANCING AND SUBSIDY MECHANISMS

We now have to analyze the different methods of financing higher education and to evaluate them in terms of the policy objectives previously stated. Accordingly, we will try to analyze successively the probable effect of the best known alternatives on external efficiency, internal efficiency, and equity. Then, we will try to measure their possible contribution to university financing in four countries of the region. Finally, in the light of the situation in and the characteristics of those countries, we will try to formulate some conclusions and suggestions.

1. Taxation system (general revenues of the nation)

The financing of higher education with the general revenues of the tax system maximizes the private rate of return on that education. The students have to bear the relatively low direct cost of study materials, transportation, and similar items. Likewise, and for a similar reason, it is here that the difference between the private and the social rate of return is greatest, given the high value of the former.

This difference provides a measure of the subsidy the students receive. The private benefit is increased because a high proportion of the necessary investment is "donated." On the other hand, the difference mentioned helps to increase the demand for higher education, despite the fact that the phenomenon of underemployment and other macroeconomic data tend to emphasize that its explosive expansion should not continue. In other words, this method of financing does not help to achieve a reasonable degree of external efficiency. Consequently, there is a disequilibrium between demand and availability of resources that must be solved by the pertinent political authorities without the chosen financial instrument helping to diminish the consequent conflict.

The mechanism being discussed does not generate any control element or incentive that can induce greater economic efficiency in the institutions of higher education. Procedures that could help determine the amount of the contribution the different universities actually need would have to be designed separately. Experience shows that only exceptionally has it been possible to advance beyond general discussions that lead to decisions based on historical precedents, social pressure, and fiscal criteria in the strict sense rather than on objective cost data and a proper breakdown of the various university functions.

Finally, from the point of view of equity, this system of financing has not, as it has been indicated, succeeded in appreciably influencing the achievement of greater equality of opportunity, while its effect on income distribution seems to have been regressive. Free higher education favors the social groups that attend the university in larger numbers and, even though it relieves the "poor" of payment, it does not address the problems of subsistence and opportunity costs.

Financing through the tax system implies a transfer from taxpayers as a whole to the users of higher education, whose socio-economic level tends to be higher than the average. It is therefore a regressive change, a statement that seems to be all the more true the greater the weight of indirect taxes (sale of goods and services, value added, customs duties, etc.) in the tax system.

2. Income tax or earmarked taxes

This consists in assigning institutions of higher education a fixed proportion or a maximum percentage of the receipts of one or more taxes. In general terms, this mechanism does not differ from the former, and its adoption is due more to reasons of political strategy than to any claim of efficiency or equity.

The theory of public finance and the technical reasons behind a correct fiscal policy categorically reject the use of this tax. Suffice it to say in this respect that the repeated use of this mechanism to finance various types of public expenditure produces a rigidity in the allocation of resources that prevents any change over time and makes the definition of priorities useless.

From the more specific point of view of the subject under discussion, the advantage of earmarked taxes is that they can reduce or weaken resistance to an increase in the tax burden. Indeed, if the increase is in a supposedly progressive tax (personal income or sumptuary consumption) and the expenditure is on a social purpose considered a priority, the mechanism acquires a legitimacy that can be decisive in achieving public support for the financing required.

In reality, it is a somewhat artificial limited analysis: as soon as the financing of a specified activity, like education, is ascribed to a progressive tax, it is evident that other expenditures (health for example) are financed by more regressive taxes. If the first case is presented as an example of equity, then it is only right to point out that the second case is essentially regressive. The result can only be determined through the joint and simultaneous analysis of all public taxes and expenses.

If the study is limited to the marginal changes introduced into the system by a progressive tax increase along with a high priority social expenditure, and if the previous constellation of taxes and public expenses is defined as insufficiently redistributive, the variation thus produced is a correct step from the point of view of equity. This is why lobbyists tend to use this mechanism to get an increase in a necessary public service while simultaneously proposing a "fair" financing formula.

Finally, it should be pointed out that there is at least one type of tax that should not be used. That is a payroll tax which—apart from other considerations—has a negative effect on employment, a major problem for most Latin American countries.

3. Payment of fees

Fees for higher education are undoubtedly an important source of financing, even though the method is used by only a small number of countries and, within them, by private universities. The main private universities in Colombia finance up to 75% of their expenses in this way. The same holds true of the recently created Universidad Autónoma de Centroamérica (UACA) in Costa Rica. On the other hand, in Chile fees represent less than 10% of income in the eight universities of the country.

The attraction of this instrument is that it can help solve simultaneously the problems of availability of a large volume of non-fiscal resources, efficient allocation of resources to higher education, economic efficiency in their use in the universities, and—according to the assumptions of the model—adjustment between the education market and the labor market. Finally, the system implies putting an end to the unfair system of free education that principally benefits the higher income sectors who provide most of the clients of institutions of higher education.

In a previous paragraph the advantages and disadvantages of the full application of a market system to higher education were stated. Nevertheless, it was also indicated that, given the nature and characteristics of the educational process and of the universities, such a scheme was subject to important limitations.

They might be summarized as follows:

a. Its full application as the sole financing mechanism will produce underinvestment in education, because the external economies and non-economic, social benefits of higher education are totally ignored.

b. Adjustment between the education and the labor market does not occur because the potential students do not have sufficient information about alternative studies and the labor market prospects (highly variable in the long run) for the different professions. The desired adjustment could take place theoretically only in the long run and after successive periods of shortage and surplus of professionals, caused by the addition, to the existing stock, of new professionals who chose their careers because they were the fashion or because of short-term expectations, but whose useful life or "production period" is very long. In other words, it does not seem to be advisable to adapt the supply of places in higher education to the demand of students who, guided by short-term forecasts, would induce a cyclical phenomenon of unforeseeable magnitude.

c. Students' decisions are influenced—and this is a fortunate fact—not only by their material expectations; rather they select their areas of study primarily on the basis of vocational factors and personal ability. This introduces a different element that affects the composition of the demand for higher education.

d. Its impact on efficiency is positive although limited as regards university teaching proper. On the other hand, it can have a negative effect on research and on the proper relationship between the two university functions.

In any event, the adoption of a generalized system of fee paying must go hand in hand with the adaptation of the organization of studies to the needs of different types of students. It is to be assumed that, should this happen, the loan system would be expanded, evening schedules would be introduced, and intermediate degrees would be established to allow the "successful" graduation of students that cannot or do not want to remain in the university for the time required to complete the traditional course.

e. The fact that tuition means that those who can afford it, pay, cannot hide the fact that those who cannot afford it must also pay. The proposal therefore becomes absolutely unacceptable from the point of view of equity unless fee payment is complemented by a suitable means of postponing payment and/or a subsidy for those who do not have sufficient financial resources.

For example, fees could be scaled to family income, as is done in some Colombian universities. The fee range must be sufficiently wide (high maximum and a minimum approaching zero) to reconcile equity with the aim of obtaining sufficient revenue. Such a scheme can be associated with a system of loans or a program of scholarships that will strengthen the model from the standpoint of equality of opportunity.

In any event, if the criterion is to be that those who are capable of paying must make their contribution in the present, the loans that can be granted must be reserved for students who would otherwise be deserving of a reduction in or exemption from tuition payment. In this way, a sizable income is also assured from the time the system is introduced.

Of course, the cost of a scholarship program must be compared with the income obtained from fees. In many countries in which the principle of the present payment of the educational cost has been applied, at least partially, the income obtained has been transferred *in toto* to the scholarship program. The respective decision is eminently political and implies an option between greater equity in the field of higher education and the achievement of alternative social purposes.

f. The general application of tuition payment or at least its use as the principal mechanism of financing private universities gives rise to the above-mentioned process of market and product differentiation that entails a certain cost in terms of equity, future distribution of income, and social divisiveness.

It is not easy to correct this situation since it does not seem politically feasible to establish a system of scholarships that will allow "good and high-cost" universities to accept a sizable quota of lower-income students. It could be rightly argued that the corresponding funds would be put to better use in more scholarships for entrance to lower-cost universities.

The combination of free state universities and private institutions self-financed through tuition payments has this segregating effect, but it also results in those who can pay attending private universities and the State subsidy going to those who really need it, because in a segmented market a lower-income student would attend a public university. To prevent a significant percentage of students capable of paying fees from availing themselves of the privilege of free education and thereby displacing lower-income candidates, the public universities should adopt a differentiated scale of fees similar to that used in private universities, a measure that would make a significant contribution to reducing the phenomenon of social segmentation mentioned above.

4. Deferred payment by students: educational loans

Educational loans as a source of financing higher education are based on the concept that a student should pay for the cost of his education, but, to avoid excluding those who are not capable of paying, a long-term loan with a reasonable grace period is offered.

Through educational loans an attempt is made to keep a large part of the characteristics of a system of present payment of the cost of education in the framework of a certain degree of competition, plus a mechanism explicitly conducive to achieving greater equality of opportunity. This concept is defined, in the context of this approach, as equality of access to the financing of studies.

Bearing in mind the considerations presented in earlier sections of this paper, the most important aspects in evaluating this method of financing higher education could be summarized as follows:

a. In spite of what is said in the previous paragraph, loan systems combine considerations of equity and efficiency because, in the selection of beneficiaries, both socio-economic factors and academic data are taken into consideration.

b. Similarly, this mechanism can be used with advantage to favor students from specified regions or certain types of secondary schools. Likewise, preferential allocation in terms of size of each loan, number of operations, reduced rate of interest or subsidized amortization provides an effective means of stimulating entry to courses of training for professions that are considered a priority or that offer the graduate inadequate salary expectations.

c. From the point of view of internal and external efficiency, the effect of educational loans is similar to that of tuition payment. Nevertheless, it has the advantage of inducing a more responsible behavior in students, because it is they and not their families who bear the burden of repayment. Information available for Colombia seems to indicate that attrition and repetition rates tend to be lower among recipients of loans.

The system of loans also shares with the payments of fee the virtue of eliminating or at least of appreciably reducing (if the subsidy elements are eliminated) the difference between social and private costs and this brings the social rate of return closer to the private rate of return.

d. Its application can be suitably combined with evening schedules, a system of credits or flexible curriculum and short professional training courses, even though the possibility of obtaining a loan can influence evening students to become full-time students or students who initially opted for easier or shorter alternatives to transfer to longer, more demanding professional training courses.

e. It is not a suitable instrument for covering subsistence or opportunity costs, because it would clearly be excessive to claim that an individual should pay out of his income in a specified period of his professional life the subsistence cost of an earlier period. To deal with this problem, a complementary scholarship program would be required.

f. It does not resolve the above-mentioned market segmentation problem because it is difficult to imagine that, when there is an overall shortage of resources, loans of sufficient size to finance access to the higher-cost universities can be considered. This is obvious if, as it will be seen below, the loan is not necessarily fully repaid.

g. Its equity effect faces the limitation that lower-income students and their families tend to be less willing to incur debts. Their propensity to assume risks is smaller while their uncertainty about their future income is greater. On the other hand, they are unfamiliar with the scope and the way financial instruments work and they naturally tend to avoid them. Furthermore, for them, the amount of the loan represents a very large sum compared with the present income levels of such groups. Finally, it is difficult for them to meet the guarantee requirements that are usually built into the loan system, a problem it has still not been possible to solve despite the development of such arrangements as collective guarantees and the like (for example, the Yale Plan).

h. The skew due to the fact that one group of students have completed their studies by paying the respective costs out of their families' income and therefore are not in debt, while others must face the repayment of a loan, involves an unfair element of discrimination.

The first group has received a capital transfer from their parents that is not subject to any tax and is unencumbered. In contrast, the second group starts its professional life with a debt service burden that forces them to delay expenditures like housing, household goods, automobile, etc., all of which retards the process of social mobility.

It should be borne in mind that this argument does not invalidate the use of educational loans; they do endow the beneficiaries with the fundamental privilege of attending institutions of higher education. We simply wished to point out that, in any event, a factor of relative discrimination continues to exist.

i. The hardest problem to resolve is that of the repayment of the loan. On one hand, the income expectations of the different professions differ appreciably. Teachers receive much lower salaries than the average for engineers or economists. Neither is there any correlation between the cost of a training course and the average income of the corresponding profession. Finally, there is a wide income range in all professions, which means that individuals that have received similar loans and incurred the same costs face payments that may represent very different proportions of their respective incomes.

Accordingly, most educational loan systems in use have recognized that it is not possible to demand complete repayment of the debt, if to do so means that the debtors have to set aside more than a reasonable percentage of their income to this purpose. This assertion is made on the understanding that the normal amortization period is from 15 to 20 years, so that it is not always possible to solve the problem by adopting longer payback periods. No one can be condemned to an almost perpetual amortization, and if this were attempted, the consequent social pressure would probably force the repeal or amendment of the system.

The solution most generally adopted is to limit the payment to a maximum percentage of the effective income of the debtor during the amortization period previously agreed upon, which implies the potential existence of a subsidy the amount of which can only be determined *ex-post.*

j. Its effectiveness as a significant source of financing for higher education is doubtful. In the first place, the maturation period of the system is long, because the first repayments are received 6 to 8 years after its introduction. Of course, this fact makes educational loans into a mechanism a government does not adopt to gain political benefits so it is a decision that requires a medium-term political horizon.

The subsidy potentially incorporated into the system, its relatively high administrative cost, and the difficulty of collection are factors that reduce the actual availability of resources expected to be obtained from loans recoveries.

If a dynamic expansion of the system in terms of the growth rate of the annual number of loans granted occurs, a rather long period can elapse before a net income is generated as a result of the operation.

These considerations led Jallade to conclude that loan schemes can mean both less State financing of higher education and an increase of public outlays for this purpose, and that only those of the second type (Sweden, Colombia) have managed to operate in a stable manner.

Finally, it can be pointed out, as Mark Blaug does (1), that, by fixing the amortization as a percentage of the income, the educational loan in fact becomes a tax (graduate tax) whose main practical difference from the tax on professionals is that it is only applied to those who obtained a loan while those who paid cash for the cost of their education are exempted.

5. Special tax on professionals

This mechanism consists in applying a new tax, additional to the pre-existing tax burden, that is imposed on professionals for being professionals. It is based on the idea that the persons that are educated should pay a part of the cost of their education. Because of this, this tax is calculated as a percentage of the higher income the graduate receives in the course of his professional life as a consequence of having studied. This increment represents the difference between the income actually received from their work and the estimated value of the one they would have received if they had only attended high school. For operating purposes, the corresponding technical calculations are transformed into a rate applicable to the effective income of each professional.

The way in which it is collected makes it look like the case of the educational loan in which the amortization is fixed as a percentage of income. From this point of view it has the advantage over the loan system of generating resources from the time it is introduced because it is retroactive in the sense that it taxes persons that finished their studies before the date of enactment of the tax. Besides, there are no administrative costs and no collection problems and it is applied to all professionals, not only those who applied for loans. Unlike what happens with educational loans, it can be applied notwithstanding the fact that students who are capable of paying them out of their personal or family income, are charged fees. It can be argued in the defense of this double taxation that the payment of fees is an instrument for income redistribution that is financed out of the consumption budget of the family group. For this proposition to be perceived as legitimate, it would probably be necessary to allocate the corresponding receipts to a scholarship program for lower-income students.

If this method is not acceptable unless fees are charged, then a system of subsequent imputation of the sums paid for fees to the tax the graduate has to pay, would have to be designed.

The mechanism under discussion also contributes to a more efficient allocation of resources, since it reduces the private rate of return on education.

From the point of view of the student, it has the advantage of not engendering uncertainty and of not discouraging the pursuit of careers that offer lower income expectations.

An additional tax on professionals does not contribute to greater equality of opportunity, so if this objective is a priority, it would need to be complemented by a suitable scholarship program.

6. Subsidy mechanisms

In the preceding section, different types of subsidy of varying importance and merit were mentioned. That analysis showed that some should be eliminated while others could play an important role in implementing one or the other method of financing higher education. It seems useful to try to summarize this aspect without repeating the earlier discussion, so only some of the more common forms of subsidy will be touched on. There are fundamentally three reasons that can legitimately be invoked for retaining some type of subsidy in higher education: equality of opportunity, income redistribution, and external economies.

On the other hand, there are five main types of subsidy: direct contribution to the institutions of higher education so they will not charge fees; scholarships for fees and subsistence; free or low-cost supply of material or facilities; subsidized educational loans; and tax deduction proportional to the expenditure incurred in higher education.

a. State contribution to institutions of higher education

This source of financing has already been analyzed; from another point of view, it is a subsidy given by taxpayers to persons attending institutions of higher education. It is enough to point out here that, as a form of subsidy, the State contribution only relieves the student of part of the direct cost of education. To achieve a larger measure of effective equality of opportunity (at least among graduates of secondary schools), it would be necessary to complement this scheme with scholarship programs designed to cover subsistence and opportunity costs, which means that a very large amount of State resources would be needed.

b. Scholarships

This type of subsidy is given directly to the student. It may consist in partial reduction of total exemption from fees or in money for meeting the subsistence expenses of the student and/or of his family.

This is an unobjectionable mechanism from the point of view of equity, because it compensates for situations of inferiority but does not involve any burden in the future.

Its administration can be complex and entail a considerable cost in view of the obvious need for analysis, evaluation, and control implicit in its operation.

As was pointed out in the previous section, its establishment on an adequate scale appears to be an essential complement to the financing alternatives that may be proposed. Therefore, it is important to quantify its cost and to estimate the income from the corresponding financing system.

c. Material facilities and subsidies in kind

This mechanism usually consists in the provision of low-cost student dormitories, cafeterias, special collective transportation, and study materials.

It is often argued that this form of subsidy is more effective than the money scholarship because it provides students with the necessary material conditions for devoting themselves to their studies, and because it avoids the "leaks" that occur when the money is freely disposable by students and their families. This argument is valid; but such subsidies are also cash that can be important in assuring the subsistence of the families of the students so that they can continue their studies instead of having to contribute to family income by working.

D. FINANCING POLICY: FOUR CASES

1. Costa Rica

Costa Rica is a country whose population was 1,871,780 in 1973 and an estimated 2,065,000 in 1977. Of this total, 56% are under 20 years old.

An analysis of the educational development of this country shows that, from the 1950's onward, relatively high levels of schooling were reached in the urban areas and that most of the population was gradually enrolled in primary education and encouraged to continue to the secondary and higher levels. On the other hand, in the rural areas the advance was slower and later, even though a sizable coverage has been achieved more recently.

The average of years of schooling for the total population aged 12 years or more rose from 3.87 in 1963 to 5.06 in 1973. In 1975, 90.8% of each age group completed the six years of the primary cycle, although the rural population was under-represented in this percentage. In 1977 the population of 18 year olds numbered 54,810 persons and those enrolled in the last school-year of secondary education was 15,787, which means that 29% of each age group is completing this cycle.

One of the salient features of this process has been the achievement of a relatively high coverage in the primary level *before* the development of the secondary and higher levels acquired momentum; this has made for an equitable distribution of education among the young population.

In the same year, 14.8% of the age group and 51.5% of the students enrolled in the last school-year of the secondary level entered the university. In relation to the national population the total university enrollment rose from 1.2% (23,048 students) in 1973 to 1.8% (37,866 students) in 1977. It should be pointed out that effective access to higher education roughly coincides with the existing demand so there is no shortage of places.

This situation, plus relatively wide access to secondary education, shows that there is a significant degree of equality of opportunity in access to higher education. The available data for the Universidad de Costa Rica (UCR) indicate that, in 1973, 66.5% of the total population had either complete or incomplete primary education, while, of the students at the university, 45.5% were children whose parents had completed the above-mentioned educational level. Those with either complete or incomplete secondary education represented 13.8% of the total population in that year and 25.6% of the students of the UCR had parents who had reached that level of study. In the Universidad Nacional (UNA) these percentages (education of parents) amounted to approximately 70% and 15%, respectively, which shows that there was no under-representation with respect to the national population. In the UNA not even the students whose parents had no education (12.3% of the population) were clearly under-represented, which was not so in the UCR, where they represented only 1.5% of the students (11).

On the other hand, while 73% of the students enrolled in the last school-year of private secondary day schools enter the university, this percentage is only 59% for public day schools, 36% for night schools, and 43% for technical schools (11). The largest skew occurs in the night school sector, which together with public day schools is the largest. This shows the importance of the "market segmentation" that occurs in the educational field, in access to higher education.

The UCR is the oldest and largest of the universities in Costa Rica. It has about 28,000 students (11) and provides almost all the traditional professional training courses. In 1973, the Universidad Nacional and the Instituto Tecnológico were created. Since it absorbed the pre-existing teacher training colleges, the education area is strongly represented in the 8,500 students of the UNA. Enrollment in the Instituto Tecnológico amounts to 1,000 students, and is expected to grow rapidly in the next years. There is a marked difference in the socio-economic composition of the students of the UNA and the UCR that is significantly correlated with training courses for professions with less social prestige and lower income expectations.

A similar correlation is found if the regional and the metropolitan branches of each university are compared (11).

Finally, university enrollment increased for several years at an average annual rate of 19% but appears to have decreased in 1977 and 1978, when a fall in demand coincided with restrictions on the increase in university resources (11).

To sum up, the educational development of Costa Rica is characterized by a rapid growth in enrollment, without there being large deficits in one level when the others expand, and a situation of relative equilibrium between supply and demand in access to the university.

Tuition fees cover a relatively small percentage of the financing of Costa Rican universities, except the recently created Universidad Autónoma de Centroamérica (UACA), a private institution that finances itself with its own income. Even though UCR fees are high—they are the equivalent of US$1,600 per year for a maximum of 12 credits or around US$133 per credit—the stipulated reductions in fees according to the financial status of the students and their families average 80% so that the amounts actually paid are small from the point of view both of family expenditure and of financing the university.

Accordingly, 83% of the resources that finance higher education come from the State, *8% from fees* (almost 100% at the UACA), 8% from provision of services and contributions from business enterprises, and 1% from minor sources (11).

In absolute figures, the fiscal contribution per student at the UCR and the UNA in 1970 amounted to 6,700 colones (US$785), while the income per student was 7,793 colones (US$912).

On the other hand, it has been estimated (11) that in Costa Rica approximately 50% of university expenditure is for teaching, so that students would be financing just over 15% of the cost of teaching. However, this contribution is not used in the global financing of the University but goes to student welfare expenditures, and, to a lesser extent, to the upgrading of personnel, which makes it an instrument of income distribution and leveling of opportunities rather than a source of direct financing of the University.

Thus, in Costa Rica most of the university costs are covered by public resources, in particular the income tax, a substantial part of the yield of which has been specifically earmarked by law for that purpose. A breakdown of the tax shows that about 15% of the total receipts is paid by professionals, while the remaining 85% is paid by business enterprises and persons who have not graduated from higher education establishments. Accordingly, the rate effectively applied to the professionals that work in the private sector is slightly higher than 4%, a figure that falls to 3% for those who are public employees.

It therefore follows that "the contribution professionals at present make to university finance is very small, and that the effective tax rate to which such professionals are subject is low" (11).

Thus, the users of higher education do not pay for it either during the course of their studies or later during their working life. This being so, the priority objectives of a policy for financing higher education in Costa Rica could be the following:

a. To release public resources and channel them to other national development objectives.

b. To achieve additional progress in the matter of equality of opportunity, particularly as regards access by the rural population to secondary education.

c. To broaden the existing system of scholarships at the higher education level so as to cover the opportunity costs of the students and to further subsidize university students that come from areas in which there are no university facilities, and to try to prevent the market segmentation between first and second-class universities.

This proposal is based on the conclusions of the study cited (11), which states, on one hand, that "the educational levels by themselves are going to discriminate less and less, which will produce a tendency to transfer the discrimination from educational levels to educational institutions." It also states that the projections of available resources and probable university expenses indicate that "in 1985, 594 million colones would be available for higher education, which is 83 million colones more than the estimated maximum required to meet the demand from students graduating from secondary schools."

In this context, the possibility of applying a special tax to professionals, calculated on the part of their income that could be attributed to the higher education received, should be considered. The basis of the calculation is the difference between the professional's salary and the average income of a secondary school graduate. A rate of 5% (which means an annual payment of 1,200 colones US$140) would yield an amount equivalent to 12% of the present fiscal subsidy (38.4 million colones compared with a public outlay on higher education of 323 million in 1977). This estimate is based on the current presumptive salaries that determine the tax burden of professionals. It is generally agreed that these salaries are substantially underestimated, so that a twofold increase in the tax base would make it possible, at the same additional rate, to collect an amount equal to about 25% of the state contribution. To finance the total teaching cost of the university, a rate of 22% would be required.

A rate of 10% on the income differential (which would not increase the tax burden for professionals to more than 8% or 10%) would yield an amount equal to 25% or 50% of the fiscal contribution, depending on whether the current presumptive salaries are adjusted.

The foregoing estimates are based, moreover, on the currently accepted proportion of the workday university teachers devote to teaching (42% in the UCR, 50% on average). Any increment in internal efficiency in this regard would mean that a larger percentage of the teaching costs would be covered with the amounts that could be collected.

An alternative would be the adoption of an educational loan system. A 12 year loan at a 10% real annual interest rate would mean that a professional would have to pay 4,700 colones a year (US$550), which would be difficult to impose. On the other hand, the fact that at present one third of the professionals in Costa Rica are teachers, whose salary level is appreciably lower than the average, makes it difficult politically to finance the average teaching cost of higher education in this way, and makes it necessary to fix the amortization of any loan system at a maximum percentage of the effective income of professionals.

Thus, as may be seen, to achieve the same financial result, the load on the taxpayer is much smaller in the tax than in the educational loan alternative. Indeed, the tax burdens all professionals—not only those who graduate from universities—from the time the system is adopted; is applied throughout the working life of the professional; and starts to yield income as soon as it is put into effect.

This scheme could be combined with tuition payments by those who can afford it and—as is done now—the yield of such fees could go towards equalizing opportunities through subsistence scholarships and housing subsidies, food, etc. for the lower income sectors. In addition, part of the yield of the tax on professionals and of the university fees could be used to broaden the system of scholarships at the secondary level, especially to support students from rural areas. Thus, for example, taking the rate of 5% proposed above as the base, if 50% of the receipts goes to scholarships, 3,800 scholarships with an annual value of US$750 each could be awarded and, if the presumptive salary were adjusted without varying the rate, this figure would rise to 7,500, which is equivalent to half those enrolled in the last school-year of secondary education.

2. Colombia

Colombia has a population of 28 million of which 57% is under 20 years of age. About 63% live in urban areas and 37% in rural areas.

In 1974, the student population numbered 5.2 million, of which 3.8 million were in primary schools, 1.3 million in secondary schools, and 148 thousand in institutions of higher education. Thus enrollment was distributed in 32,230 primary schools, 4,288 secondary schools, and 96 institutions of higher education. Of the last-mentioned, 27 were technical institutions and 69 are defined as universities. Of the universities, 24 were public and 45, private, figures that reflect the great expansion of higher education in Colombia (22). In this regard, it is to be noted that in 1976 the number of students enrolled in private universities amounted to 104,548, or slightly more than the 100,015 students in public universities. It should also be noted that the percentage of students in public universities fell from 56.2% in 1966 to 48.9% in 1976 (22).

The enrollment ratio was a little less than 70% in primary schools, 35% in the secondary level, and 5.9% in higher education (population between 19 and 25 years in 1974) (22). About 15% of the 18 year-old population leaves secondary schools each year, which reflects the high drop-out rate at the secondary level, estimated at 70% in 1970.

The large number of universities and the fact that approximately 50% of the students attend private universities, have produced a complex and differentiated system as regards both its geographical dispersion (22) and the range of quality and cost of studies (7).

Consistent with this pattern are the marked differences in the financing of higher education establishments. The main source of financing of public universities is the State contribution, which in 1975 amounted to 22,516 pesos

(US$680) per student, which implies a total fiscal subsidy equivalent to about US$60 million. If 50% of the university cost is allocated to teaching, then the contribution per student is US$340.

On the other hand, the private universities receive very small contributions from the public treasury, averaging no more than 2% of their expenditures. Thus, for example, the Universidad de Los Andes finances 66% of its expenditure with fees; the Universidad Social Católica de La Salle, 90%; and the Universidad Pontificia Javeriana, close to 80% (Tables XI-1 and XI-2).

Thus, it is a system in which only the public establishments are subsidized, and in which the national government pursues a flexible policy in recognizing private institutions of higher education. This is reflected in the fact that, as a rule, the higher income groups attend private universities while the less affluent sectors enroll in public establishments or in "low-cost" private regional universities. We thus have a clear case of market segmentation in which the educational product tends to be differentiated on the basis of the coexistence of high-cost private universities and low-cost public universities, which leads to the perception (rightly or wrongly) that the quality of the former is better. The segmentation noted already exists at the secondary level; 82.3% and 76.2% of the families belonging to the professional and upper class or the urban bourgeoisie, respectively, send their children to private high schools. This proportion drops to 44.5% and 39.9% for manual and farm workers (7).

To prevent an excessive concentration of higher-income students, the Universidad de Los Andes has established a system of differentiated fees whose amount varies according to the salary and liquid assets of the family. In 1977-78 the maximum was US$1,100 per year, the minimum, US$450, and the average, about US$610 per student.[2]

The Universidad de La Salle, on the other hand, charges a fixed amount per credit that cannot be reduced or waived, which means an annual payment of between US$300 and US$500, depending on the course. Similarly, the fee income of the Universidad Pontificia Javeriana in 1977 was equivalent to US$42 million, which, given a total of 12,000 students, gives an annual average of US$350 per student.

It therefore follows that the above-mentioned private universities charge their students an amount similar to the fiscal contribution per student to the public establishments (in the Universidad de Los Andes, the amount is considerably higher). Since the private universities allocate a greater proportion of their resources to teaching, it follows that they have a substantial margin with which to offer educational services of a higher quality.

The system described operates in a situation in which, because of the selection process that takes place at the primary and secondary levels, the percentage of university applicants that come from the lower-income groups is small. The professional and upper class, which represents 2.3% of the total population, accounts for 14.8% of the secondary school graduates. On the other hand, the 46.9% of the population that are tenant farmers account for only 8.5% of the secondary school graduates (7). It is because of this that, despite the fact that the State subsidy is limited to the public universities whose students come from groups with lower incomes than those in private universities, the available data seem to indicate that the subsidy is socially regressive.

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[2] Information obtained directly by the author.

Indeed, in a recent study (17, p. 51) Selowsky found that the subsidy to primary education was highly progressive, since it amounted to 12.6% of the income for the lowest quintile of the country, 6.1% for the next quintile, and only 0.6% for the richest quintile. The subsidy to secondary education was less progressive, since the corresponding percentages were estimated at 5.8%, 4.4%, and 0.5%. As for higher education, Selowsky's study confirmed the findings of earlier studies that the incidence of the subsidy is regressive, since the poorest quintile of the population receives practically nothing of it (because its effective access to higher education is minimal), the next quintile receives 0.5% of its income as a subsidy, and the richest quintile receives a transfer equivalent to 1.2% of its income. In addition, the highest quintile receives 60.4% of the State subsidy to higher education, while the next quintile receives 23.5%. The weight of this educational level in the global allocation of resources is such that, if the subsidies that affect the three educational levels are added, the highest quintile constituted by 15.4% of the population receive 21.3% of the total subsidy, while the 25.1% of the population that make up the lowest quintile receive only 19.8% of the total subsidy.

In this context, the work of the Instituto Colombiano de Crédito Educativo y Estudios Técnicos en el Exterior (ICETEX), the objective of which is to give financial support to students who need it, mainly in the form of long-term loans, is exceedingly important. It provides services to graduate students abroad, students in Colombian universities and, by way of scholarships, to students in rural primary and secondary schools. Its main purpose is to promote equality of educational opportunities (9).

The magnitude of the effort already made by ICETEX in higher education is reflected in the figures; in 1975 it granted loans to 12,753 of the 160,740 higher education students, the average loan amounting to 9,784 pesos (US$314) (22). In that year, the system thus helped 8% of the respective student population, including students in both public and private universities (for example, 10% of the students in the Universidad de Los Andes received ICETEX loans in 1975).

In contrast—and as was suggested earlier in this paper—the system that ICETEX manages still does not represent a major source of financing of higher education. Indeed, the budget for 1978 shows an income in the amount of 600 million Colombian pesos, of which only 35 million or 6% of the total comes from the recovery of loans granted earlier (9).

According to ICETEX projections it intends to expand coverage of the undergraduate level in the country to 25% in the period 1978-1982 (9), which, in view of the preceding observation, would mean a sizable increase in the corresponding public expenditure. This increased State contribution will not reduce the present subsidies to the public universities by a like amount because part of the loans benefit students in private establishments and because they are also used, in part, to finance the subsistence costs of the beneficiaries.

On the other hand, it should be borne in mind that the above-mentioned fiscal contribution to higher education amounts to 21% of the public expenditure on education and to 4% of total public expenditure (22). In the light of the foregoing analysis, a subsidy of this magnitude does not appear to have a clear social justification nor does it seem likely that the system of educational loans will be able to help reduce it in the foreseeable future.

It therefore follows that the low fees charged by public universities cannot be justified; it should at least be possible to establish a system similar to that of the Universidad de Los Andes. A scale like the one used by that institution, could, if its absolute values were halved, yield approximately US$30 million for the public universities as a whole. For example, if half of this amount were used to expand the scholarship program for lower-income students, a balance of US$15 million would be available for financing teaching in public universities, which is equivalent to approximately 25% of the fiscal contribution to higher education in 1975. If we assume that 50% of this transfer goes to teaching costs, the scheme under discussion would help finance half of the teaching costs, in the strict sense, of public higher education.

Alternatively, a tax on professionals can—as already stated—be levied on the higher income obtained as a consequence of having attended institutions of higher education. According to data for 1970, the income differential amounts to about 4,450 pesos per month, which would be equivalent to about US$2,900 per year (23). If we halve this figure, because of the obvious risk of error that such calculations involve, and apply the resulting amount to the 200,000 economically active Colombians that have completed university studies, we obtain a higher income of US$290 million. A 5% rate on this income would yield about US$15 million, which—according to the estimates in the previous paragraph—would also make it possible to finance about 50% of the teaching cost of the public universities.

To sum up, the very tentative examples just presented show that in Colombia it is possible to reduce the fiscal contribution to the financing of higher education and, in so doing, to achieve greater relative equity (because those who can afford it would pay, even in the public universities) and to advance towards greater equality of opportunity by earmarking for scholarships a significant percentage of the income that will be received from one or the other of the schemes mentioned or by some combination of the two.

3. Bolivia

Bolivia has a population of 5,800,000, of which 53% is under 20 years of age. In 1975, the combined enrollment of the basic (1st to 5th grades), intermediate (6th to 8th grades), and secondary (9th to 12th grades) amounted to 650,000 students, of which almost 60% were in basic schools (24).

The available figures indicate that this country is still in a relatively incipient stage of educational development. Thus, only 12.4% of the population between the ages of 10 and 14 has attended a secondary school, 41.57% has had between 4 and 6 school years of primary school, and 33.08% has not gone beyond the 4th grade of the primary level (16). At the same time, for the age group 15-19 years, the net secondary school enrollment ratio is under 32%,and in the rural area the gross ratio is 41.3%, but only 15.6% are students that are not behind (16).

In other words, a youth in the age group 15-19 years in the urban area has a 0.68 probability of reaching the secondary level, while another of the same age who lives in the rural area has only a 0.21 probability. At the university level (20 to 24 years) the probabilities are 0.15 to 0.01, respectively. The progressive attrition in the levels that come after the basic cycle of primary education show how difficult access to secondary and higher education is, and this applies particularly to the lower income groups (25). The resultant educational pyramid shows 83% of students at the primary level, 11.8% at the secondary level, and only 5.1% in higher education establishments.

In any event, the information available shows that there has been a strong expansion of the school system in the last fifteen years (1960-1974), both as regards more entrants to the educational system and a higher retention rate in the schools. Thus, between 1960 and 1974 school enrollment increased at a rate of 6%, which was higher than the population growth rate (2.1% annually). Furthermore, the enrollment growth rate was higher in the higher grades (14% and 13% for the 11th and 12th grades respectively) (16).

In spite of these recent advances, the most serious educational problems in Bolivia occur at the base of the system. Accordingly, the development of higher education does not yet appear to be a really priority problem. Of course, the strong selection that occurs at the primary and secondary level rules out for the time being any possibility of higher education making a significant contribution to greater equality of opportunities. Besides, the studies made confirm that the type of secondary school attended influences scholastic achievement: almost 80% of the students that enter the 9th grade of private secondary schools graduate.

Accordingly, there appears to be little point in allocating a high proportion of national resources to finance university teaching. In addition, the relative absence of graduate courses suggests that there is little scientific activity in the universities.

It therefore follows that the expenditure on higher education should not widely differ from the cost of teaching, which should be borne by the families of the students and/or be met through a tax on professionals.

The enrollment in the last school-year of the secondary level amounts to 20,400 students, which is equivalent to about 16% of 18 year-old age group. For its part, the total university enrollment has risen from 22,036 in 1972 to 34,586 in 1976, and to 41,408 in 1977. As can be seen, recently the expansion has been very rapid, increasing 19.7% in 1977 over 1976, in spite of which there does not appear to be a problem of access to the university for those who complete the secondary cycle (24).

This rate of growth will probably continue in the future, given the above-mentioned accelerated expansion in the number of students in the higher grades of secondary education. This means that, in a few more years, university financing may become a serious problem in a country in which it will still take several decades to solve the educational deficit at the primary level (especially in rural areas) and at the secondary level.

In this respect, it should be noted that public expenditure on education amounts to approximately 20% of the national budget (15), 10% of it being allocated to higher education (26).

The budget of the Universidad Católica Boliviana for 1978 shows that no more than a third of the expected income will come from public funds ($b. 5 million) while $b. 4 million will come from fees and the like. The balance of the budget, to bring it up to $b. 15 million, comes from the provision of services and private donations (see Table XI-3).

According to the estimates of a recent study (Musgrave), there were 6,990 self-employed professionals in Bolivia in 1976. Assuming that there is a similar number of professionals in the public sector and as employees of private enterprises, there would be a total of 14,000 professionals in Bolivia.

A very preliminary attempt to quantify the possibility of releasing fiscal resources and channeling them to activities that have greater priority and less self-financing capacity may be summarized as follows:

a. If the 40,000 university students were charged fees averaging the equivalent of US$200 a year, about US$8,000,000 could be collected; assuming that half those resources were used to expand scholarship programs at the secondary and higher level, there would still be around US$4,000,000 with which to finance higher education. Thus, the present fiscal contribution could be reduced by at least 30%.

b. According to the above-mentioned Musgrave Report, the taxable income of self-employed professionals averaged $b. 6,750 in 1975 or the equivalent of about US$340. For the total estimated number of professionals in Bolivia, this would represent a tax base of about US$60 million. It it is assumed that the higher income received by the professionals *qua* professionals represents 50% of the total, the basis of the calculation for the purposes of this analysis would amount to US$30 million. If a rate of 10% were applied to that differential, an income of US$3 million per year would be obtained, which would represent a very high proportion of the present fiscal expenditure on higher education.

4. Chile

Chile has a population of about 10.8 million, of which 47% is under 20 years of age. The educational system has achieved a near complete coverage in the primary cycle while, in 1977, 110,000 students or 47% of the 17 year olds completed the secondary level. The number of places available for the first year of university studies reached a maximum of 47,300 in 1973 and then fell off to about 34,000 in 1978 (27). This means that 31% of the secondary school graduates could enter the university (in reality they have to compete with the "overaged," who represent earlier secondary school graduations).

The fact that secondary education does not offer significant possibilities of technical training makes it a step that primarily leads to the university. Because of the great expansion in secondary education from 1969 onwards (as a consequence of the educational reform of 1965), the supply of places in the universities has not increased fast enough to absorb all the candidates, a situation that has worsened since 1974. In any event, a number of students equivalent to 15% of the 18 year age group annually enters the university.

An analysis of the evolution of enrollment in Chilean universities (27) shows that it rose from a total of 41,800 students in 1965 to 99,600 in 1971; 140,000 in 1973; and a maximum of 147,000 in 1975; and then fell off in the following years to 130,000 in 1977.

Higher education in Chile is mainly financed by the State, and even though of the eight existing universities only two are public (the other six are private), there are no significant differences from the point of view of financing. From this perspective they can all be considered public universities.

The fiscal expenditure on education has fluctuated between 13% (1965) and 18% (1972) of total fiscal expenditure, and is estimated at 14.8% for this year

(28). Higher education has been absorbing a growing proportion of the fiscal expenditure on education. From 29.6% in 1965, it rose to 39.8% in 1973 and 41% in 1974 and then fell to 36% in 1978. This means that the universities have absorbed up to 5.3% of total fiscal expenditure (1977) and 1.5% of gross national product (estimated at 5.4% and 5.1%, respectively, for 1978). In absolute terms, this means a fiscal outlay of about US$205 million for 1978.

The data summarized here point up the heavy weight of university expenditure in the fiscal budget. It should be noted that there is considerable scientific activity in the Chilean universities the financing of which is included in the foregoing figures, as is that of many other activities that are also carried out by them (extension, several hospitals, symphony orchestra, etc.). In any event, the resources allocated to research are far from reaching the goal of 1% of GNP mentioned earlier.

Thus, it is reasonable that one of the declared objectives of the present policy for financing higher education should be to sharply reduce the fiscal subsidy to the universities. In this regard, according to the available data, the State contribution towards financing the current and capital expenditures of the universities as a whole represented 84% of their income in 1965 (estimated at 79% in 1978), although for one of the private universities the fiscal transfer amounted to 93%. The remaining 21% comes from the provision of services of various kinds and, to a lesser extent, from payment of tuition fees, an item that has not been significant so far, in spite of repeated declarations of intent in this regard. In the period 1964-73, the fiscal contribution rose at a rate of 13.6% as against 0.2% for the category "own income." Finally, according to data from the Budget Directorate of the Ministry of Finance, the State contribution represented 87.5% of total university income in 1973, an estimate that is higher than the previous one whose source was the General Accounting Office of the Republic.

The actual amount of the fees varies from one university to another. As a rule, a specified amount is set and then reduced according to the socio-economic circumstances of the student. In the Universidad de Chile, the normal payment amounts to almost US$200 a year, the amount actually charged being US$170 as a result of approved requests for reduction, which mostly come from the regional branches, where the socio-economic level of the students is lower.

It should be emphasized that, although the less favored social sectors are under-represented in the university, they constitute a significant proportion of the students that are concentrated in the courses that offer lower income expectations and the branches that enjoy less social prestige. A recent study shows that 21% of the students in the northern branch of the University of Chile belong to the lower income, 22% to the higher income, and the remaining 57% to the broad and heterogeneous middle income group (30).

On the other hand, the average expenditure per university student is equivalent to approximately US$2,200 per year (scientific research and other activities included), a figure that is relatively high compared with other countries.

Consequently, it may be said that the fiscal subsidy will continue to represent an important factor in the financing of higher education in Chile. Nevertheless, the amount of public resources committed makes it necessary to find mechanisms that will transfer part of the costs to the users and their families. Because of the sizable proportion of lower-income students, any arrangement established must be complemented by a suitable scholarship program that should include some contribution to the financing of the subsistence costs of poor students.

For example, let us assume that the cost of university studies (teaching) (estimated tentatively and by way of illustration at 50% of university costs) will be financed by means of a loan system. Assuming an average duration of studies of six years, a 12-year loan at a 10% annual rate of interest would require annual payments of about US$970, that is, US$80 a month. If a 15-year term were stipulated and a real interest rate of only 5%, the monthly payment would be reduced to US$50 per month. The foregoing estimates are based on average costs per student in Chilean universities as a whole, and ignore the considerable variation between institutions, branches, and courses.

The results obtained represent an excessively high payment for professionals such as teachers, for example, whose monthly income is no higher than US$350; this means that with this arrangement it would be possible to finance only part of the teaching costs and confirms what was said above, namely that the amortization of educational loans must be a maximum percentage of the actual income of each professional.

Alternatively, as in the cases presented earlier, there could be a special tax on professionals, calculated on the basis of the income differential due to their being university graduates. For this purpose and solely for the purposes of illustration, the salary scale of the public sector has been taken as representative of the salaries received by individuals that have completed secondary school and by university graduates. Under these conditions, a tax of 10% on the difference in income between the two categories would yield close to US$81 million, which would be equivalent to approximately 60% of university teaching costs. The magnitude of this figure seems to indicate that it is worth while exploring the social and political feasibility of such an arrangement.

E. CONCLUSION

The analysis contained in this document and the tentative calculations presented in section D show that the State contribution to the financing of higher education can be reduced through either of the alternatives examined or through a combination of them.

Indeed, it appears possible to achieve this result without impairing the objectives of equity and efficiency, provided that the financing policy adopted incorporates instruments whose conjoint use will enable progress in achieving the various objectives to be made simultaneously. Thus, the payment of fees and/or the special tax on professionals should be associated with a substantial increase in scholarship programs, since direct payment adversely affects the poorest and the tax is neutral in its effect on equality of opportunities.

Of course, the analytical reasoning and arithmetical exercises are mere grist for the political decision, since measures that entail an additional tax obligation on specified groups in society require sufficient social support and the corresponding government will.

In conclusion, it should be emphasized that in this paper the subject has been treated in static terms and on the basis of a limited analysis. If a society were to set general access to higher education as a priority objective, it would, of course, need an entirely different model. Thus, for example, if the number of students were massively increased and the periods of formal and informal education of various types and with various objectives were perceptibly extended, anyone who had anything to teach would somehow have to participate in the educational process. In this event, what we would have would be a general social duty and it would be essential to develop new and more meaningful forms of solidarity. Such speculations fall, of course, outside the scope of this paper.

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STATISTICAL APPENDIX

Table XI-1. Colombia: Universidad de Los Andes, Budget Projection 1977-1978

I. OPERATION	
Income	
Tuition	100,398
Special programs	15,281
National Government contribution	2,400
Research	16,060
Auxiliary activities	6,500
Other income	8,220
Specific programs	3,000
Total income	**151,859**
Expenditures	
Instruction	80,222
General expenditures on instruction	10,925
Research	20,241
Physical plant	9,850
General expenditures on Administration	7,430
Auxiliary activities	5,650
Specific programs	8,080
Transfers and contingencies	9,041
Pension adjustments	1,000
Total expenditures	**146,989**
II. INVESTMENTS	
Income	
Contributions	2,500
Expenditures	
Debt service	3,400
Repairs buildings	4,000
Total expenditures	**7,400**
Total income	**154,859**
Total expenditures	**154,859**

Note: Unofficial data obtained directly.

Table XI-2. Colombia: Universidad Javeriana: Budget 1977

Income	
Operational	
Tuition	144,005
Registration	6,025
Secretarial fee	1,338
Non-collegiate courses	3,298
Vacation courses	1,356
Extension courses	1,982
Graduate courses	861
	164,683
Special	
National Aid	5,578
Leases	861
Publications	352
Clinics	1,900
	9,159
Medical service	5,932
Total	**179,774**
Expenditures:	
Staff services (salaries, severance pay, bonuses, allowances, etc.)	119,423
General services (expenses, supplies, maintenance, etc.)	38,045
Investments (equipment, library, etc.)	17,129
Amortizations and taxes	5,177
Total	**179,774**

Note: Unofficial data obtained directly.

Table XI-3. Bolivia: Universidad Católica Boliviana, Budget 1978

[illegible]100	GENERAL BASIC INCOME		
[illegible]111	% Net global income Contribution (2% of 5%) the net global income		5,000,000
5200	ACADEMIC INCOME		
5210	ACADEMIC FEES		
5211	Tuition	436,500,00	
5212	Entrance examination	40,000,00	
5213	Credit fees	3,443,500,00	
5214	Degree tests	3,000,00	
5215	Special fees	20,000,00	
5216	Thesis preparation	10,000,00	
5217	Music workshop	50,000,00	
			4,003,000
5220	DOCUMENTATION FEES		
5221	Certificates	20,000,00	
5222	Diplomas	5,000,00	
5223	Identification cards	20,000,00	
5224	Legalizations	3,000,00	
5225	Other documents	3,000,00	
			51,000,000
5230	TEACHING MATERIAL		
5231	Policopies	1,000,00	
5232	Photocopies	80,000,00	
5233	Books and catalogs	1,000,00	
			82,000,00
5300	CAPITAL RESOURCES		
5310	SHARE INCOME		
5311	Shares		60,000,00
5320	OTHER INCOME		
5321	Contribution by Episcopal Boliviana ''Edificio Esperanza'' a) Support to U.C.B. Budget	1,800,000,00	
5322	Income Bar U.C.B.	80,000,00	
5323	Income Printing Section	100,000.00	
			[illegible],980,000
[illegible]400	SPECIAL INCOME		
5410	RESEARCH AND SERVICES		
5411	Socio-economic research	1,500,000,00	
5418	C.I.O.P.	700,000,00	
5419	Seminars—Business Administration	100,000,00	
5420	Seminars—Communication	50,000,00	
			2,350,000
5500	DONATIONS		
5510	LOCAL DONATIONS		
5512	Contributions to scholarship students EMUSA	28,000,00	
5513	QUIROGA	60,000,00	
5514	VILLEGAS	12,000,00	
5515	DORIA MEDINA	12,000,00	
5517	FRANCO GUACHALLA	40,000,00	
5518	SAAVEDRA-BANZER	15,000,00	
5519	SERAFIN-FERRUFINO	105,000,00	
			342,000
5600	OTHER INCOME		
5601	Rents not charged by the Conferencia Episcopal Boliviana		1,224,000
			15,092,000

Note: Unofficial data obtained directly.

ANNEX

A Model for Measuring the Demand for Educational Outlays in Latin America

José A. Herrero[1]

INTRODUCTION

The proper allocation of public resources to education is perhaps one of the issues that has been longest debated in the discussion of solutions to the problem of economic and social underdevelopment. It is not only a social but also a technological problem: how to endow the labor force with the skills and knowledge required to deal with the complex drama of economic and social development.

For many years the Latin American countries have addressed the educational problem by allocating increasing amounts of funds to it.

The purpose of this paper is to analyze, to the extent permitted by the data available, the financial implications of the traditional educational system. It is not a matter of evaluating results but rather of evaluating the possibility of expansion to meet the growing needs of educational systems in Latin America today.

A. A DYNAMIC DISEQUILIBRIUM MODEL OF THE DEMAND FOR EDUCATIONAL RESOURCES

The model presented in this section has been designed to determine the demand for expenditure on education in Latin America. The educational systems comprise three levels: primary, secondary, and higher. Levels 1, 2 and 3 respectively. It was decided to divide the educational sector into these three levels since they were considered to represent the minimum scale of technical education for matching the supply of the labor force with the demand.

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The model is dynamic, non-linear in the variables but linear in the parameters. It is not an equilibrium model. A considerable amount of econometric courage would be needed to postulate educational equilibrium models in Latin American societies, even more so at the level of determination of flows by outlays and generation of products for education.[2]

In section B, the difficulties imposed on the methodological and quantitative analysis of the model by the lack of data will be explained.

1. The structural equations of the model

The model consists of three equations that specify the demand, three that specify the supply, and three identities that express the dynamics of disequilibrium.

a. The demand for education.

The complete specification of the model is expressed as follows, the first equation being:

$$E_3^D = E_3^D \left[{}^{r}P_{t-5},\ A/\bar{I}_n,\ \left(\frac{\dot{N}}{N} = \frac{\dot{I}_n}{I_n} \right) \right] \tag{1}$$

E_1^D	Flows of demand for primary education services generated by total students enrolled.
${}^{r}p_{t-5}$	Rate of population growth lagged by one "generational" period.
A	Agricultural gross national product.
I_n	Industrial gross national product.
$\dot{I}_n/I_n$	Growth of industrial GNP.
$\dot{N}/N$	Growth rate of employment in the industrial sector.

The population growth rate variable appears with a lag of five years in order to reflect the pressure of the new population on the structure of primary education. It is postulated that, when the rate of population growth is positive, it will generate a pressure—at the end of five years—due to the increase in the demand for primary education. The higher this rate, the higher will be the demand for primary education services.

The agricultural product/industrial product ratio shows the pressure the structure of the product exerts on the demand for primary school services. The coefficient of A/I_n explains the level of dependence of agricultural production and the level of rigidity of the economic structure in facilitating social mobility in Latin America and, therefore, in explaining the dynamics from the first educational level to the second and from the second to the third. Changes in the structure of the product will tend to generate changes in the demand for educational services. The parameter that weights the value of (A/I_n) is expected to be negative[3]: a decrease in the ratio (A/I_n) will generate a greater demand for primary education since it will call for greater integration of the rural population into the productive system, the product of the growth of A and, therefore, into the educational system. In addition, the parameter represents an expansion of the base of the educational sector for underpinning the future expansion of secondary and higher education, the product of the expansion of I_n.

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[2] The econometric tradition was based on equilibrium models. The model postulated is a partial equilibrium model and contains a dynamic mechanism that reflects the process of adjustment of the market for educational services.

As the reader will see, because of lack of suitable information, it was decided when the model was quantified to take a particular case of the dynamics of adjustment. Nevertheless, the theoretical discussion of the model and the econometric specification were set forth in the general form of disequilibrium so as to facilitate its theoretical discussion and its practical application as and when the availability of data in this field increases.

Finally, the ratio $(\dot{N}/N - \dot{I}_n/I_n)$, which in the strict sense measures the inverse of the growth rate of productivity, puts a dynamic element into the model; to the extent that $(\dot{N}/N - \dot{I}_n/I_n)$ decreases, that is to say, becomes more and more negative, which appears to be the general case in Latin America, more skills in the human capital of the worker are demanded; this involves an intensification in the demand for primary education in preparation for the secondary and higher levels. That is to say, to the extent that the rate of growth of industrial productivity is positive; $(\dot{N}/N - \dot{I}_n/I_n) < 0$; to that same extent the demand for primary education is going to intensify. Not to reach the primary level but rather to be able to move from it to higher levels.[4]

The flow of demand for education at level 2 is expressed as follows in the model:

$$E_2^D = E_2^D (E^D{}_{1_{t-1}}, {}^rP_t - 10, [\dot{N}/N - \dot{I}_n/I_n]) \qquad (2)$$

E_2^D Flow of demand for educational services at the secondary level.

The expression $E^D{}_{1_{t-1}}$ to determine the demand or the flow of demand for services by E_2^D is obvious. Students who pass through level 1 will exert pressure on the system for enrollment in level 2.

Furthermore, the variable that expresses the inverse of productivity growth[5], as it appears in the primary sector, is included in the model in this sector, in order to reflect the hypothesis of education as a positional good.[6]

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[3] Both A and I expand but the growth of I_n is greater than that of A, which implies a decrease in A/I_n. On the other hand, an increase in both A and I_n tends to increase the demand for educational services. For institutional reasons, urban primary education is better served than rural education (ECIEL 12). A slow growth of I_n has a greater effect on the demand than a rapid growth of A because the coverage in urban areas is greater than in rural areas and, therefore, although A/I_n decreases, the demand increases.

[4] A specific case of the hypothesis that education is a positional good.

[5] The inverse of productivity is expressed for algebraic reasons. That is, to point out a skew in the growth of demand as productivity increases. In this way, it is recognized that there is an institutional limit to demand for secondary education. Under the present structure, the demand should not be more than what is offered by the structure of the system and its curriculum.

[6] This expression implies the following dynamics: to the extent that productivity increases and, with it, the technological knowledge required, the level of education must be measured so that one may remain at least in the same relative position in the labor market as one was in at the beginning.

E_3^D is perhaps the most difficult variable to specify in the model. It depends on the pressure the secondary sector exerts on higher education, on the relative distribution of income, and on the distribution of the urban/rural population.

$$E_3^D = E_3^D\left(E^D{}_{2_{t-1}}, \frac{Y_{\text{Highest decile}}}{Y_{\text{Average}}}, \frac{P_U}{P_R}\right) \tag{3}$$

Because of the high subsidy[7] to higher education, the more unequal the distribution, the more intense the demand for higher education under the present structural conditions.[8]

The variables used in this equation and not defined previously are as follows:

Y	Level of income per capita
Y_{Average}	Average income level of population
P_U	Urban population
P_R	Rural population.

The supply of educational services is divided into two sub-groups: private and public. The model only considers the formation of supply on the public sector side. The formation of supply on the private sector side is predetermined in the model.

$$E_1^0 = E_1^0\left({}^rP_{t-5}, \frac{A}{I_n}, \frac{\dot{C}_1}{C_1}, \frac{S_1}{M_1}, \frac{\dot{Y}_G}{Y_G}\right) \tag{4}$$

E_1^0	Flow generated by the human and physical resources at the elementary level.
$\dot{C}_1/C_1$	Rate of growth of costs per student
S_l/M_l	Student/teacher ratio
$\dot{Y}_G/Y_G$	Rate of growth of fiscal expenditure.

The formation of supply at the secondary level represents the reaction of the State to the phenomenon of economic growth in terms of education. It is, to a certain extent, the response of the government to the demand for the positional good that education represents.[9]

$$E_2^0 = E_2^0\left(\left(\frac{\dot{N}}{N} = \frac{\dot{I}_n}{I_n}\right), \frac{\dot{Y}_G}{Y_G}, \frac{\dot{C}_2}{C_2}, \frac{S_2}{M_2}\right) \tag{5}$$

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[7] See the papers of Jallade (2), Tanzi (3), Selowski (4) and Zymelman (5), which deal with this subject in detail.

[8] Under other structural conditions, the contrary could be argued. This, of course, would require a radical change; at least in the present policy.

[9] The reader will note that, to specify the supply, it is necessary to take into consideration a set of elements that, in actual fact, are variables that make up the important instruments of the public policy of the government in defining its educational policy: budgetary allocations, salaries of teachers, direct or indirect subsidies, changes in income distribution through the tax system, construction of facilities and regionalization of the construction of facilities.

It should be noted that the last three variables are subject to manipulation by the government. Taxes, salaries of teachers, and the availability of human resources for education are in large measure determined unilaterally by the government.[10]

The supply of higher education is largely specified institutionally. Hence, it will depend on the resources of the government and on the degree of dynamism of the industrial and public sectors.

$$E_3^0 = E_3^0\left(\frac{\dot{Y}_G}{Y_G}, \text{DIN}, \frac{S_3}{M_3}\right) \tag{6}$$

where

DIN degree of dynamism of the industrial and/or public sectors.

$$\text{DIN}; \{-1, 0, 1\}; [0, 1]$$

Because the basic hypothesis of the model is that it is one of disequilibrium, it is necessary to specify the functions that identify the pressures in each subsector. These equations are expressed as follows:

$$\dot{M}_1 = E_1^D - E_1^0 \tag{7}$$

$$\dot{M}_2 = E_2^D - E_2^0 \tag{8}$$

$$\dot{M}_3 = E_3^D - E_3^0 \tag{9},$$

Where M_1, $\dot{M}_2$, $\dot{M}_3$ express the functions of excess demand for services at each level.

As will be seen below, $\dot{M}_1$, $\dot{M}_2$, and $\dot{M}_3$ measure the levels of student "mortality" in passing from levels 1 to 2, 2 to 3 and at 3.[11]

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[10] This phenomenon should be clearly established in the specification of the supply. One of the major difficulties in quantifying educational models is the lack of identification, or inadequate specification, of the parameters that are to be estimated. To avoid this problem, the model has been specified completely; this facilitates identification of the parameters in the reduced form of the model.

[11] The excess demand for educational services is difficult to specify accurately. On the one hand, the phenomenon of student attrition is an important element in excess demand. In addition, there is a volume of unsatisfied demand due to the fact that a professional candidate at any level considers the value of the income obtained i.e., the internal rate of return on his investment in education, to be lower than the opportunity cost of the investment; if educational conditions were improved, this candidate would be willing to effectively demand educational resources; otherwise, his demand is only potential. In addition, excess demand may arise as the result of deficiency or inelasticity on the supply side. The deterioration of school buildings, the lack of teachers in particular areas, the shortage of educational material also produce excess demand. Finally, excess demand is a complete set of dynamic pressures that reflect a permanent phenomenon of disequilibrium with special structural characteristics.

B. STATISTICAL INFORMATION

One of the most important restrictions on the extension and refinement of the model discussed here is due to the unavailability and reliability of the country data.

The information available is not sufficiently clear and reliable to develop a model that encompasses the educational systems of the Hemisphere. While some countries admittedly have a considerable store of information on the educational sector, it is also true that most of the countries do not have complete or reliable information. Hence, the model has been limited to very particular variables of a higher degree of reliability.[12]

All the economic variables are defined in constant prices. By expressing them as ratios or rates of growth, it is possible to make inter-country comparisons, regardless of the size of the countries.[13]

Now, the differences between countries will undoubtedly produce biases in the measurements. Unfortunately, this problem cannot be solved at the quantitative level because of lack of sufficient information.[14]

An effort has been made to keep the number of explanatory variables to a minimum in order to introduce the smallest number of measurement errors into the model. On the other hand, an effort has been made to select as explanatory variables those that are expected to be subject to the least error.

The lack of reliable information about M_1, M_2, and M_3 has made it necessary to introduce a restrictive assumption in deriving the reduced form; that is: $\dot{M}_1 = \dot{M}_2 = \dot{M}_3 = 0$. The implications of the introduction of this restriction into the model are as follows: it makes it necessary to solve the model in its stationary state and, to a certain extent, interferes with the interpretation of the results of the model. Because of this difficulty, in solving the model, the present state of things—the observations for each country—must be compared with what would happen in the stationary state—see Tables A-5, A-6, and A-7.

The problem of the heteroscedasticity and self-correlation of the information was solved in the mixed section and through the historical series by using the appropriate econometric methods indicated by Nerlove (7) and Fair (10).

The data are for five-year periods, from 1965 to 1975, for 19 Latin American countries.[15] Fifty-seven observations in all.

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[12] The sources of information for strictly economic variables are the IDB and the IMF. Variables relating exclusively to education were extracted from the UNESCO yearbook.

[13] This argument is valid if we assume similar structures for education at the global level.

[14] The bias that would be introduced would be towards under-estimation of the model, since the introduction of variables that are actually non-linear relations when defined as proportions reduces the scale of the variables. See Nerlove (1) and Griliches (6).

[15] See Table-5 in the Statistical Appendix.

2. The solution of the disequilibrium model

The structural form of the model may be written as follows:[16]

$$E_1{}^D = E_1{}^D\left[{}^{r}P_{t-5},\ A/I_n,\ \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right)\right] \tag{1}$$

$$E_2{}^D = E_2{}^D\left[E^D{}_{1t-1},\ {}^{r}P_{t-1},\ \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right)\right] \tag{2}$$

$$E_3{}^D = E_3{}^D\left[E^D{}_{2t-1},\ \frac{Y_{\text{Highest decile}}}{Y_{\text{Average}}},\ \frac{Pu}{Pr}\right] \tag{3}$$

$$E_1{}^0 = E_1{}^0\left[{}^{r}P_{t-5},\ \frac{A}{I_n},\ \frac{\dot{C}_I}{C_1},\ \frac{S_1}{M_1},\ \frac{\dot{Y}_G}{Y_G}\right] \tag{4}$$

$$E_2{}^0 = E_2{}^0\left[\left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right),\ \frac{\dot{Y}_G}{Y_G},\ \frac{\dot{C}_2}{C_2},\ \frac{S_2}{M_2}\right] \tag{5}$$

$$E_3{}^0 = E_3{}^0\left[\frac{\dot{Y}_G}{Y_G},\ \frac{S_3}{M_3},\ \text{DIN}\right] \tag{6}$$

$$\dot{M}_I = E_1{}^D - E_1{}^0 \tag{7}$$

$$\dot{M}_2 = E_2{}^D - E_2{}^0 \tag{8}$$

$$\dot{M}_3 = E_3{}^D - E_3{}^0 \tag{9}$$

From the analytical point of view, the model is expressed in 9 equations with 9 endogenous variables, which, because the model is previously normalized, appear on the left-hand side of the equals sign. Furthermore, the model concerned must be considered a specific block of the general model of the entire economy, in which, for the case under discussion, a set of variables that, in the strict sense, are endogenous and are determined in other blocks of the global model, will be considered predetermined. This is the case, for example of A/I_n, $(\dot{N}/N - \dot{I}_n/I_n)$, (P_u/P_r) $(\dot{Y}_G/Y_G)$ and others. By substituting equations (1) and (4) into (7) we obtain:

$$\dot{M}_1 = E_1{}^D\left[{}^{r}\dot{P}_{t-5},\ \frac{A}{I_n},\ \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right)\right] - E_1{}^0\left[{}^{r}P_{t-5},\ \frac{A}{I_n},\ \frac{\dot{C}_1}{C_1},\ \frac{S_1}{M_1},\ \frac{\dot{Y}_G}{Y_G}\right] \tag{7A}$$

---

[16] The reader should note that reference is to the structural form of the model; it cannot be estimated directly because of its simultaneous character and, in addition, because of its disequilibrium character proper; the reduced form of the model must be used to estimate the parameters so that the model is statistically valid from the predictive point of view. See R. C. Fair (8), (10) and Theil (9).

Also generated in the same way are:

$$\dot{M}_2 = E_2{}^D\left[E^D{}_{1t-1},\, {}^rP_{t-10},\, \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right)\right]$$

$$- E_2{}^0\left[\left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right),\, \frac{\dot{Y}_G}{Y_G},\, \frac{\dot{C}_2}{C_2},\, \frac{S_2}{M_2}\right] \qquad (8A)$$

$$\dot{M}_3 = E_3{}^D\left[E^D{}_{2t-1},\, \frac{Pu}{Pr}\right] - E_3{}^0\left[\frac{\dot{Y}_G}{Y_G},\, \text{DIN},\, \frac{S_3}{M_3}\right] \qquad (9A)$$

[illegible]$_1$, $\dot{M}_2$, and $\dot{M}_3$, as is known, measure the excess demand for services at each educational level. The measurement $\dot{M}_1$ will logically be a complex set of economico-social phenomena that reflect the excess demand for educational services at each educational level. It is to be noted that $\dot{M}_1$ may have negative values, in which case this would be reflected in the increases in the idle capacity levels of each educational level.

The result of completely specifying equations (1), (4) and (7A) is as follows:

$$E_1{}^D = A_{01} + A_{11}\, r_{pt-5} + A_{21}\frac{A}{I_n} + A_{31}\left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right) \qquad (1)$$

$$E_1{}^0 = A_{04} + A_{14}\, r_{pt-5} + A_{24}\frac{A}{I_n} + A_{34}\left(\frac{\dot{C}_1}{C_1}\right) + A_{44}\left(\frac{S_1}{M_1}\right)$$

$$+ A_{54}\left(\frac{\dot{Y}_G}{Y_G}\right) \qquad (4)$$

$$\dot{M}_1 = (A_{01} - A_{04}) + (A_{11} - A_{14})({}^rP_{t-5}) + (A_{21} - A_{24})\frac{A}{I_n}$$

$$+ A_{31}\left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right) - A_{34}\left(\frac{\dot{C}_1}{C_1}\right) - A_{44}\left(\frac{S_1}{M_1}\right) - A_{54}\left(\frac{\dot{Y}_G}{Y_G}\right) \qquad (7A)$$

where by rewriting (7A) in the form

$$\dot{M}_1 = A_{07} + A_{17}\, r_{pt-5} + A_{27}\, A/I_n + A_{37}\left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right)$$

$$+ A_{47}\left(\frac{\dot{C}_1}{C_1}\right) + A_{57}\left(\frac{S_1}{M_1}\right) + A_{67}\left(\frac{\dot{Y}_G}{Y_G}\right) \qquad (7A)$$

where:

$$A_{07} = (A_{01} - A_{04})$$

$$A_{17} = (A_{11} - A_{14})$$

$$A_{27} = (A_{21} - A_{24})$$

$$A_{37} = A_{31}$$

$$A_{47} = -A_{34}$$

$$A_{57} = -A_{44}$$

$$A_{67} = -A_{54}$$

The expected signs for the structural form are as follows:

Demand	*Supply*
$a_{01} > 0$	$a_{04} < 0$
$a_{11} > 0$	$a_{14} > 0$
$a_{21} < 0$	$a_{24} < 0$
$a_{31} < 0$	$a_{34} < 0$
	$a_{44} > 0$
	$a_{54} > 0$

See sections A.1.a and A.1.b, equations (1) and (4), for an explanation of the signs.

The coefficients A_{01}, A_{04}, A_{11}, A_{14}, A_{21} and A_{24} cannot be identified on the basis of the estimate of the reduced form. However, for the purposes of the model, the net effect on the educational sector is what most concerns us. Thus, for example, if $a_{11} - a_{14} > 0$ since in the theoretical specification of the model it is assumed that $a_{11} > 0$ and $a_{14} > 0$, then it follows that the pressure exerted by the population growth rate on the primary educational level is greater than the response of the supply for that level, and this generates a pressure in that sector that will have to be adjusted through increases in M_1, that is to say, $\dot{M}_1 > 0$ and thus will have to be reflected in increases in non-participation in the educational system or in student attrition. The same may be said for the coefficients A_{21} and A_{24}; even if it is hypothesized that $a_{21} > 0$ and $a_{24} > 0$ the model calculates the value $A_{27} = a_{21} - a_{24}$; when $a_{21} - a_{24} > 0$ we know that the pressure on the demand side is greater than the expansion of the supply on the primary level. A_{27} is completely identified in the model, as is a_{34}, a_{44} and a_{54}. Nevertheless, these last three will appear in the reduced form with the sign changed; that is to say, with a sign contrary to that specified in the assumptions for specifying the structural model.

The solution for the secondary education sector is similar to that presented earlier; from (2), (5) and (8) we obtain:

$$\dot{M}_2 = E_2{}^D \left[E^D{}_{1t-1}, r_{pt-10}, \left(\frac{\dot{N}}{N} \le \frac{\dot{I}_n}{I_n} \right) \right] - E_2{}^O \left[\left(\frac{\dot{N}}{N} \le \frac{\dot{I}_n}{I_n} \right), \frac{\dot{Y}_G}{Y_G}, \frac{\dot{C}_2}{C_2}, \frac{S_2}{M_2} \right] \tag{8A}$$

If

$$E_2{}^D = A_{02} + A_{12}\, E^D{}_{1t-1} + A_{22}\, r_{pt-10} + A_{32}\left(\frac{\dot N}{N} - \frac{\dot I_n}{I_n}\right) \tag{2}$$

and

$$E_2{}^0 = A_{05} + A_{15}\left(\frac{\dot Y_G}{Y_G}\right) + A_{25}\left(\frac{\dot N}{N} - \frac{\dot I_n}{I_n}\right) + A_{35}\left(\frac{\dot C_2}{C_2}\right) + A_{45}\left(\frac{S_2}{M_2}\right) \tag{5}$$

$$\begin{aligned} \dot M_2 = {} & (A_{02} - A_{05}) + A_{12}\, E^D{}_{1t-1} - A_{15}\left(\frac{\dot Y_G}{Y_G}\right) + A_{22}\, r_{pt-10} \\ & + (A_{32} - A_{25})\left(\frac{\dot N}{N} - \frac{\dot I_n}{I_n}\right) - A_{35}\left(\frac{\dot C_2}{C_2}\right) - A_{45}\left(\frac{S_2}{M_2}\right) \end{aligned} \tag{8A'}$$

by rewriting

$$\begin{aligned} \dot M_2 = {} & A_{08} + A_{18}\, E^D{}_{1t-1} + A_{28}\left(\frac{\dot Y_G}{Y_G}\right) + A_{38}\, r_{pt-10} \\ & + A_{48}\left(\frac{\dot N}{N} - \frac{\dot I_n}{I_n}\right) + A_{58}\left(\frac{\dot C_2}{C_2}\right) \cdot + A_{68}\left(\frac{S_2}{M_2}\right) \end{aligned} \tag{8A'}$$

where

$$\begin{aligned} A_{08} &= (A_{02} - A_{05}) \\ A_{18} &= A_{12} \\ A_{28} &= A_{15} \\ A_{38} &= A_{22} \\ A_{48} &= (A_{32} - A_{25}) \\ A_{58} &= -A_{35} \\ A_{68} &= -A_{45} \end{aligned}$$

The expected signs for the structural form are as follows:

Demand	*Supply*
$a_{02} > 0$	$a_{05} > 0$
$a_{12} > 0$	$a_{15} > 0$
$a_{22} > 0$	$a_{25} < 0$
$a_{32} > 0$	$a_{35} > 0$
	$a_{45} > 0$

See Sections A1 and A.1.b, equations 2 and 5, for an explanation of the signs.

The solution for the higher education sector is also similar to the two previous solutions. From (3), (6) and (9) we can rewrite:

$$\dot{M}_3 = (A_{03} - A_{06}) + A_{13}\, E^{D}{}_{2t-1} - A_{16}\,\frac{\dot{Y}_G}{Y_G}$$

$$+ A_{23}\,\frac{Pu}{Pr} - A_{26}\,\frac{S_3}{M_3} - A_{36}\,\mathrm{DIN} \qquad \text{(9A')}$$

$$\dot{M}_3 = A_{09} + A_{19}\, E^{D}{}_{2t-1} + A_{29}\,\frac{\dot{Y}_G}{Y_G} + A_{39}\,\frac{Pu}{Pr} + A_{49}\,\frac{S_3}{M_3} + A_{59}\,\mathrm{DIN} \quad \text{(9A')}$$

where

$$\begin{aligned} A_{09} &= (A_{03} - A_{06}) \\ A_{19} &= A_{13} \\ A_{29} &= -A_{16} \\ A_{39} &= A_{23} \\ A_{49} &= -A_{26} \\ A_{59} &= -A_{36} \end{aligned}$$

The expected signs for the structural form are as follows:

Demand	*Supply*
$a_{03} > 0$	$a_{06} > 0$
$a_{13} > 0$	$a_{16} > 0$
$a_{23} > 0$	$a_{26} > 0$
	$a_{36} > 0$

See sections A.1.a and A.1.b, equations (3) and (6), for an explanation of the signs.

As may be seen, from the solution of the model we obtain the following parameters.

$$\begin{array}{lll} A_{07} = (A_{01} - A_{04}) & A_{08} = (A_{02} - A_{05}) & A_{09} = (A_{03} - A_{06}) \\ A_{17} = (A_{11} - A_{14}) & A_{18} = A_{12} & A_{19} = A_{13} \\ A_{27} = (A_{21} - A_{24}) & A_{28} = A_{15} & A_{29} = -A_{16} \\ A_{37} = A_{31} & A_{38} = A_{22} & A_{39} = A_{23} \\ A_{47} = A_{34} & A_{48} = (A_{32} - A_{25}) & A_{49} = -A_{26} \\ A_{57} = A_{44} & A_{58} = -A_{35} & A_{59} = -A_{36} \\ A_{67} = A_{54} & A_{68} = -A_{45} & \end{array}$$

Where A'_7, A'_8, A'_9 represent the parameters of the reduced form of the block of the educational model.

The lack of information for $\dot{M}_i$ also poses the problem of solving the model in terms of another alternative endogenous variable. In the case being studied, the model has been solved in terms of S/M_i. In order to adapt the model to the availability of data, this is the first transformation that has to be made in the model. This, in turn, implies the reformulation of equations (7A), (8A) and (9A). Accordingly, the equations become:

$$\frac{S_1}{M_1} = \frac{A_{01} - A_{04}}{A_{44}} + \frac{A_{11} - A_{14}}{A_{44}} rP_{t-5} + \frac{A_{21} - A_{24}}{A_{44}} \frac{A}{I_n}$$

$$+ \frac{A_{31}}{A_{44}} \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right) - \frac{A_{34}}{A_{44}} \left(\frac{\dot{C}_1}{C_1}\right) - \frac{A_{54}}{A_{44}} \left(\frac{\dot{Y}_G}{Y_G}\right) \qquad (7B)$$

$$\frac{S_2}{M_2} = \frac{A_{02} - A_{05}}{A_{45}} + \frac{A_{12}}{A_{45}} E^{D}{}_{1t-1} + \frac{A_{22}}{A_{45}} {}^{r}P_{t-10}$$

$$- \frac{A_{15}}{A_{45}} \left(\frac{\dot{Y}_G}{Y_G}\right) + \frac{A_{23} - A_{25}}{A_{45}} \left(\frac{\dot{N}}{N} - \frac{\dot{I}_n}{I_n}\right) - \frac{A_{35}}{A_{45}} \left(\frac{\dot{C}_2}{C_2}\right) \qquad (8B)$$

$$\frac{S_3}{M_3} = \frac{A_{03} - A_{06}}{A_{49}} + \frac{A_{13}}{A_{49}} E^{D}{}_{2t-1} - \frac{A_{16}}{A_{49}} \left(\frac{\dot{Y}_G}{Y_G}\right) \qquad (9B)$$

$$+ \frac{A_{23}}{A_{49}} \frac{Pu}{Pr} - \frac{A_{36}}{A_{49}} \text{Din} \qquad (9B)$$

On the basis of these specifications, a few additional transformations must be made. The values of $(\dot{N}/N - \dot{I}_n/I_n)$ for a considerable number of countries are not reliable or are incomplete. Even for countries for which information is available, the values are not comparable. With this situation as a basis, the following construction was made: the inverse of the productivity growth rate is inversely correlated with the growth of the product. To the extent that there has been an increase in the capital/labor ratio in Latin America, labor productivity increased and its inverse decreased; if the product increased, then: $(\dot{N}/N - \dot{I}_n/I_n)$ and the rate of increase of the product r_g are negatively related. On the other hand, it is to be expected that the correct sign of the reduced form for r_g will be positive. The hypothesis for a_{31} is that $a_{31} < 0$; if $(\dot{N}/N - \dot{I}_n/I_n)$ and r_g are negatively related, then the sign of the reduced form for r_g should be positive; in the structural form, this sign continues to be negative.

For the variable $\dot{C}_1/C_1$ no information is available for most of the countries; because of this it is necessary to replace $\dot{C}_1/C_1$ by a suitable proxy; the proxy used for this variable represents the proportion of the product devoted to M_1. The variable $\dot{Y}_G/Y_G$ was replaced by the trend variable. It would have the financing of education. This will be positively related with the value of $S_1/$ been easier to use the value of $\dot{Y}_G/Y_G$ for which information is available; however, the availability of disaggregrated levels of government revenue differs greatly from country to country.[17] To use $\dot{Y}_G/Y_G$ without reconciling the differences in the disaggregation would have caused serious problems of bias in the measurements for each country. Under the assumption of a continuing increase in Y_G, a variable that measures the trend as an adequate approximation to the level of $\dot{Y}_G/Y_G$ was used.

In accordance with the restriction derived from the information available, (7B) was computed as follows:

$$S_1/M_1 = A'_{07} + A'_{17}\,\mathrm{RP} + A'_{27}\,\mathrm{AGIN} + A'_{37}\,\mathrm{RG} + A'_{47}\,\mathrm{PIBED} + A'_{57}\,\mathrm{TRD} \qquad (7C)$$

the coefficients are A_{ij}' in order to consider the change of (7B) to (7C) where

RP is equivalent to r_{p_t-r}
AGIN is equivalent to A/IN
RG is equivalent to $(\dot{N}/N - \dot{I}_n/I_n)$ via a proxy
PIBED is equivalent to $\dot{C}_1/C_1$ via a proxy
TRD is equivalent to $\dot{Y}_G/Y_G$ via a proxy

The estimated equation for S_2/M_2 was

$$S_2/M_2 = A'_{08} + A'_{18}\,\mathrm{RP} + A'_{28}\,\mathrm{RG} + A'_{38}\,\mathrm{PIBED} + A'_{48}\,\mathrm{TRD} + A'_{58}\,\mathrm{ESPR1}. \qquad (8C)$$

RD is equivalent to r_{pt-10} and ESPR1 is equivalent to $E^{D_1}{}_{t-1}$.

To estimate (9C) the procedure discussed above was used. The results for the three equations will be presented jointly below

$$(S_3/M_3) = A'_{09} + A'_{19}\,\mathrm{RG} + A'_{29}\,\mathrm{TRD} + A'_{39}\,\mathrm{ESPR2} + A'_{49}\,\mathrm{DIN} \qquad (9C)$$

C. RESULTS OBTAINED FOR EACH EQUATION OF THE MODEL AND THE EXPECTED SIGNS

Even though the model was discussed in its structural form, the results presented below only reflect the reduced form of the model. This is so because the purpose of this model is to make a set of predictions about the demand for educational resources in Latin America.

The results were discussed in two parts: for Latin America as a whole and for each country in particular.

The reduced form of the educational system is presented in Table A-1.

1. Primary education

The results obtained in computing S_1/M_1 are presented in Table A-2.

A number of pertinent points may be derived from Table A-2.

a. The trend in S_1/M_1 is associated with the least significant parameter.

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[17] See Rezende (11).

b. The value of the parameter of the growth rate of the product is also of little significance.

These two elements point to the fact that in Latin America primary education appears to be governed by institutional characteristics, that is to say, the demand for primary education is determined by the rate of population growth and the growth of the agricultural product in relation to the industrial product. As for the factors that attenuate this pressure towards growth, educational outlays as a proportion of GDP are highly significant; the negative sign of this coefficient shows that an element of the model that tends to limit the pressure on the primary level is the allocation of resources to the education sector to meet the growing pressure that population growth exerts on this educational level.[18] Furthermore, the value of the coefficient $^{r}p_{t-5}$ is positive and significantly high. This shows that the same happens with A/I_n. Nevertheless, care should be taken in interpreting the coefficient $(\dot{N}/N - \dot{I}_n/I_n)$; as and when productivity increases, it is to be expected that demand for educational resources at the primary level will increase, that is to say, the demand for education occurs in practice because of intensity in the use of human capital. This entails an inverse relation with respect to $(\dot{N}/N - \dot{I}_n/I_n)$; if on the other hand $r_g - 1_a$—the rate of growth of the product—and $(\dot{N}/N - \dot{I}_n/I_n)$ are inversely related, then the estimated coefficient of $(\dot{N}/N - \dot{I}_n/I_n)$ via rg must be positive even though $(\dot{N}/N - \dot{I}_n/I_n)$ and rg are negatively correlated.

The expected sign for $\dot{Y}_G/Y_G$, measured via TRD, proved to be positive. The working hypothesis was committed to the positive sign in that this variable of public policy tends to expand the supply. The fact that we obtained a positive sign, which is equivalent to a negative sign in the structural form of the model (see equation 7B), directly implies decreasing success on the part of Latin American governments in satisfying the supply required by the demand of the primary education sector. Another possible explanation for this change of sign may be the nature of the variable used as a proxy; the fact that this is the historical trend suggests that this variable reflects structural effects of the system other than the variable that is to be measured.

2. Secondary education

The parameters associated with the variables indicated are presented in Table A-3.

The reduced form of the model of education at level 2 is significantly revealing.

In the first place, all the coefficients are positive except the constant. This phenomenon points to a continuing pressure on the growth of the variable S_2/M_2, that is to say, a pressure towards the continuing growth of the average number of students per teacher that will be reflected in the use of the physical capacity and the teaching load of teachers at the secondary level.

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[18] Other elements like greater efficiency in the allocation and use of the meager resources, better quality of education, and better organization of the educational system, which also reduce the amount of pressure of demand for educational services, are not considered explicitly in the model. Insofar as one or more of the factors mentioned in this footnote are perfect substitutes for the allocation of more funds to education, the results would be the same as those already mentioned.

The foregoing is valid even when the percentage of students that move from primary to secondary education is low. The coefficient of the load from the first level to the second is 0.2821 (see Table A-3). Only because of growth of the primary sector, plus the normal trend of the secondary sector, will a pressure be generated on the growth in the number of students per teacher equal to 14 students per teacher. It is to be noted that the average number of students per teacher in 1975 was 21. This means that, for a period of five years, the rate of growth will be 67% if the system is to be kept at the same levels as in 1975.

As has been seen, the signs associated with the variable of the secondary sector have the same characteristics as in the primary sector except in the case of the variable $\dot{C}_2/C_2$ or PIBED. The expected sign will be negative in the structural form (see equation 8B); this is equivalent to hypothesizing that the Latin American governments are not discouraged from financing more secondary education when the costs increase or from increasing the required proportion of the educational expenditure as a share of the product. This generates a number of additional pressures. It decreases the supply in the secondary sector by generating a pressure towards the generation of excess supply in the higher sector and excess demand in the primary sector. This in turn tends to reduce the size of the base of the primary sector and thus that of all the system. In a productive system that increasingly calls for more skills, it would not be surprising if the pressures were circular and increasing.

3. Higher education

The results are presented in Table A-4.

Although all the signs obtained correspond to the hypotheses stated, the importance of TRD in the case of P_u/P_r must be emphasized. The urban/rural population coefficient is increasing and has been increasing during the period of observation. However, it is difficult to specify which population strata should be included as urban or as rural in each country. To escape this taxonomic arbitrariness, reliance has been placed on the hypothesis that P_u/P_r increases with the historical trend. Thus the reduced form of S_3/M_3 was quantified by substituting P_u/P_r for TRD. As was expected, the parameter proved to be positive and highly significant.

The hypotheses of the equation for the higher sector as well as the results corroborate the phenomenon expressed with respect to secondary education. In the equation for this sector, the dynamic variable was divided in two parts D_1 and D_2.[19] D_1 measures the dynamics of the structural changes in the product and D_2 the dynamics of the growth of the product. In the two cases the demand is positively related to the technological dynamism of the economy (see equation 9B). A clear implication of the results for S_3/M_3 is an expression that is written as

$$S_3/M_3 = 0.575\text{RG} + 0.\text{[illegible]}44\ \text{ESPR2} + 8.0$$

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[19] $D_1 = (1.0)$
$D_2 = (-1, 0, 1)$. See list in Table A-7 in the Statistical Appendix.

where

$$ESPR2 = 21$$

and

$$S_3/M_3 = 15$$

$$RG = 6.53$$

This means that if the Latin American structure of higher education is to be maintained, the economy must grow at a real annual rate of 6.53%.

In higher education the coefficient of the load it receives from secondary education is 0.1544. It is even lower than that from primary to secondary. This points to another degree of inefficiency in the use of facilities. Low load coefficients, as well as a few low rates in the student/teacher ratio while, on the other hand, primary education is deteriorating, cannot mean anything else but inefficiency in allocation and, therefore, unequal subsidy to those who need it less, i.e., those who reach the tertiary level of education.

D. SOME SPECIAL CONSIDERATIONS ON THE RESULTS

It should be emphasized that, generally speaking, the values of the parameters are highly significant. For the S_1/M_1 equation, all the parameters, except that associated with $\dot{Y}_G/Y_G$, are significant at the 95% level. The parameter associated with $\dot{Y}_G/Y_G$ has a level of significance of 70%. The parameters of the equation for S_2/M_2 also have high confidence levels although lower than those for S_1/M_1. The level of significance of the parameters of S_3/M_3 is 95% or more for all cases.

1. Primary education

Several aspects of interest associated with the quantification of the model should be emphasized. Educational expenditure as a proportion of the gross product of each country is highly significant. For primary education its sign is negative and for secondary education, positive. A detailed analysis of the structural forms of the model—see in this case the equations (1), (4) and (7A)—point, as has already been mentioned, to the erosion of the Latin American education system. On the one hand, in primary education, to the extent that $\dot{C}_1/C_1$ increases, S_1/M_1 also increases, which entails a heavy pressure towards an educational overload at the level of primary education. On the other hand, the important elements of demand generate a strong pressure towards the growth of S_1/M_1. The case of $\dot{Y}_G/Y_G$ is the only element that tends to limit the pressure on (S_1/M_1).

The results of the equation for S_1/M_1 may be summarized as follows:

a. An increase in the population growth rate increases S_1/M_1. The parameter of r_{pt-5} is 2.7917, which implies that for each point of increase in the rate of population growth, the coefficient S_1/M_1 will increase 2.7917 units. If in the stationary state S_1/M_1 is approximately 27 (26.9634 according to the results of the model), an increase of one point in the population growth rate will increase the value of S_1/M_1 by approximately 10% (2.7917/27.0). On the other hand, if $\dot{S}_1/S_1 - \dot{M}_1/M_1 = 10\%$, then in order to maintain the same levels of S_1/M_1 as existed in 1975 and thus to prevent the overload on primary schools, the number of teachers must be increased at a rate equal to that of the growth of primary enrollment plus 10%. Thus, if for the period 1970-75 the rate of growth of S_1 was 4.5%, then the number of teachers hired must be increased by 14.5%.

For example, if primary school enrollment was 55 million in 1975 and the number of $S_1/M_1 = 30$ for that year, it would be necessary to hire approximately 260,000 additional teachers in order to keep S_1/M_1 constant (55 million/30 = 1,800,000; 1,800,000 * 0.145 = 255,000 teachers, US$2,000 per teacher = US$510,000,000). If, on the other hand, it is assumed that teachers' salaries represent 66% of the cost of primary education, then a further US$750 million would be necessary at the primary level in order to prevent the system from deteriorating. That is to say, an additional US$13 per student per year.

b. If $r_p = 2.8$, $A/I_n = 1.0$, $r_g = 5.0$, PIBED = 4.0, TRD = 4.0 and $S_1/M_1 = 34.2$; an increase of S_1/M_1 to 40 would mean that the efficiency of the primary education system would have to be increased by 17% (40 − 34.2)/34.2. This would imply an increase in the PIBED of 3.10 absolute points or a considerable reduction in the unit costs of primary education during the next five years.

The exercise presented in the foregoing paragraph should be analyzed very carefully. If an increase in the S_1/M_1 ratio is accompanied by an increase in efficiency in the use of educational resources, obviously an increase in the efficiency reduces the need for greater allocation of PIBED. Thus, for example, if the increase from 34 to 40 in the variable S_1/M_1 is all translated into greater efficiency, the allocation of the PIBED may be reduced to 1% during the period of time of the reduction in unit costs by increasing S_1/M_1 to 40; this reduction in costs must be approximately 3% annually.

If, on the other hand, the increase in S_1/M_1 to 40 is not accompanied by an increase in efficiency, then no reduction in the PIBED could occur. An increase from 34.2 to 40 in 5 years represents an annual rate of 3.0%; if the rate of increase of enrollment is 4.5% per year, an increase in PIBED is required to finance the remaining 1.5%.

c. An important exercise that can be carried out with the equation S_1/M_1 is to determine the relationship between the population growth rate and the need for education finance in Latin America.

If S_1/M_1 is solved for the average values of the agricultural product/industrial product ratio; rate of growth of the product and trend, we obtain the following equation:

$$\text{PIBED} = 0.85 + 1.5\text{RP}$$

where

$$\text{AGIN} = 1.5$$

$$\text{RG} = 5.0$$

$$\text{TRND} = 4.0$$

and

$$\frac{d(\mathrm{PIBED})}{d(\mathrm{RP})} = 1.5$$

The results of the foregoing equation show that the elasticity of the rate of gross product devoted to primary education is approximately 1.3. This means that if the population growth rate is 3%, the minimum rate of the product ratio devoted to education will be 4%. It should be noted that this is the minimum necessary to prevent a deterioration in the quality of education at all levels in 1975.

The minimum rate was determined for each country in particular. See Table A-5.

Table A-5 is highly revealing. As was said earlier, the model was solved for $\dot{M}_1 = 0$, and the results obtained imply the necessary minimum rate for maintaining the *status quo ante.*

On the basis of the results, the countries may be grouped as follows: high position with respect to primary education; medium position and low position:

High position:

Argentina, Bolivia,[20] Chile, Uruguay

Medium position:

Colombia, Costa Rica, Panama, Peru, Venezuela

Low position:

Brazil, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Paraguay,[20] Dominican Republic.

The implications of the phenomenon that may be seen in Table A-III-5 are rather clear. All the Central American countries except Costa Rica and Panama show a permanent situation of deterioration in their primary education structure.

The primary education levels of Brazil and Mexico are also deteriorating. Also surprising is the fact that economies such as these, which in the near future have to face growing demands for skilled workers, at present show a depressing picture in their primary education levels.

Argentina, Bolivia, Chile and Uruguay are in an clearly advantageous situation. The case of Bolivia should be viewed with caution since, although the level of enrollment in primary education is admittedly high, the drop-out rate is one of the highest in Latin America. This points to considerable inefficiency in the use of resources in primary education.

Two-thirds of the Latin American countries, as far as primary education is concerned, live in conditions of continuing deterioration in their educational opportunities. On the other hand, some of the countries that appear with advantageous situations are going through special periods of instability and it would be bold to state that they are in an advantageous position.

2. Secondary education

The case of the dynamics of the equation for S_2/M_2 is different from that of S_1/M_1.

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[20] The cases of Paraguay and Bolivia offer a doubtful result as regards credibility. These cases need to be studied in greater detail.

a. An increase in S_1/M_1 generates a pressure towards an increase in S_2/M_2 of 0.2821 units of S_2/M_2 per unit of S_1/M_1.

If, as in the foregoing case, S_1/M_1 increases from 34.2 to 40, this would imply an increase of 1.64. To satisfy this additional pressure on the system, it is necessary to increase the PIBED by 1.27 points; that is to say, from 4.0 to 5.27%. Now if efficiency in the use of the resources associated with S_2/M_2 increases in such a way that, with the same resources, S_2/M_2 can be increased from 20 to 21.7, that is to say, an increase in efficiency of 1.7% annually, then the PIBED has no reason to increase above the historical levels.

b. On the other hand, the fact that all the pertinent parameters of the function for S_2/M_2 are positive indicates that the S_2/M_2 ratio increases with the increase in costs $\dot{C}_2/C_2$; this appears to point to the fact that there is a wide margin for improving efficiency in the allocation of resources in this sector since if S_2/M_2 increases, it would be logical to expect $\dot{C}_2/C_2$ to decrease or become negative. The fact that this does not happen points in the above-mentioned direction.

c. In experimenting with the equation for (S_2/M_2), we obtain the following results:

$$19.24^{21} = 0.9582 \text{ RP} + 1.2931 \text{ PIBED} + 0.2821 \text{ ESPR1}$$

$$\text{RG} = 5.0$$

$$\text{TRND} = 4.0$$

$$\text{ESPR2} + \text{C} = 25$$

If RP = 3 since ESPR1 = 35, then 1.2931 PIBED = 6.24, which implies that the PIBED necessary to maintain the levels of 1975 is 4.83%. The minimum requirements for each country are presented in Table A-6.

The results of Table A-6 are very paradoxical; generally speaking, the countries with a precarious situation in their primary education appear to require a very limited amount of resources in order to be able to maintain the same relative position in their secondary education.

The explanation of this problem has a number of aspects:

i. Some countries with a deficient situation in their primary education have a low rate of participation of the population in primary education and a high rate of student attrition at the primary school level. This reduces the pressure on the secondary education level, the cost of which is reflected in great inefficiency in the use of the resources of primary education or low capacity for generating services or low quality of facilities or unusual combinations of these factors.

ii. The countries that have a deficient situation in their primary education show very unequal income distributions. By concentrating secondary schools in the capital cities and cities with a high population relative to the rest of the country, they tend to operate their secondary schools at a high level of underutilization.

iii. Countries with a deficient situation in their primary education do not

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[21] $25 - 5.0 * 0.2253 - 1.16 * 4$

tend to provide sufficient socio-economic incentives to interest the family of students in seeing that students continue their studies.

iv. They are also countries in which income levels are low. This explains why their opportunity cost of continuing studies is relatively high.

The contrast offered by S_1/M_1 and S_2/M_2 is significant, which appears to point to a vicious circle of educational deterioration in Latin America; the countries that have the greatest need to allocate their resources to primary education use their resources in inefficiently allocating them to secondary education; they thus create an educational deficit in primary education that will be reflected in inefficiency in the secondary school level and in low national productivity; it also implies low utilization of the secondary levels, which in turn drain resources that could be allocated to primary education.

3. Higher education

The case of the dynamics of the equation for S_3/M_3 is a special case. For example, a low level A/I_n and a rapid increase in the manufacturing sector generate a considerable reduction in the ratio S_3/M_3.

a. If the dynamics of the economy is accelerated towards industrialization, the educational system responds by considerably reducing S_3/M_3 and generating what may be interpreted as excess supply at the higher level.

b. Only 15% of the enrollment per teacher at the secondary level enter into the determination of S_3/M_3.

c. The impact of $\dot{Y}_G$ in this equation, measured by the proxy TRD, is significantly high. This points to an underestimated interest in the importance of higher education.

d. Table A-7 shows the difference between values of the levels of ESPR3 for 1975 and the expected levels for the same year. It should be noted that Bolivia, Brazil, Haiti, Mexico, Nicaragua and Paraguay present significant deficits in the financing of primary education while at the same time showing marked under-utilization of higher education facilities.

From Table A-8 it is clear that for no country in Latin America is higher education a financial restriction. All, with the exception of Panama, show growth rates equal to or greater than that needed to maintain their higher education at the same relative position of 1975. This case also points to the same problem posed by secondary education. In addition, the case of Panama indicates a major change of educational policy beginning in 1970.

E. SUMMARY AND CONCLUSIONS

The model developed in this paper evaluates the financial needs of education in Latin America. It represents a first econometric approximation of a major and highly important problem.

A dynamic, non-linear model was constructed to describe the conditions of structural disequilibrium of the educational sector. The limited availability of information did not make it possible to apply it individually to each country, but it can be applied whenever a historical series of at least eight observations are available. The model may be applied for five-year periods, as is done in this attempt, or through annual observations. In this case the dynamic structure becomes more complex because of the effect of different cohorts on the dynamic process. The model is divided into three sectors: primary, secondary or intermediate, and higher.

The structural form of the model presents the fundamental objective factors that the Latin American educational process faces both on the demand and on the supply side. These structural forms, of course, may be varied in order to meet the special characteristics of each country. In the case of the general model, it was kept at a high level of aggregation in order to analyze the common problems and to make comparisons that have some degree of validity.

In the special application of the model for each country, variables that measure levels of expectations and uncertainties in the basic variables of the behavior of Latin American growth may be introduced.

The quantitative analysis to which the model was submitted shows that primary education in Latin America is significantly underfinanced or that, at least, the resources allocated are used very inefficiently: so that even if the expenditure may be considerable in relative terms, the results are far from being satisfactory over the entire primary level.

The dynamics of the education system are also unstable. In the primary level, inefficiency or underfinancing tends to weaken the size of the educational base; nevertheless, the countries continue to expand the base of the secondary and higher sectors; thus, instability and inefficiency become more general: neither resources nor better efficiency criteria are applied at the primary level and the resources allocated to the secondary and tertiary levels are expanded. Inefficiency and scarcity in primary; inefficiency and underutilization in the remainder. All this points in the direction of a burden equivalent to a tax on the primary levels, especially, perhaps, as some authors note, on the poorest and rural sectors of the population; whereas, on the other hand, it points to heavy subsidies at the secondary and higher levels that tend to absorb the urban and high income strata.

Finally, the results of the quantification of the model suggest a question that should be answered carefully and in great detail: what are the opportunity costs of the development of secondary and higher education in an environment in which primary education is continuously deteriorating?

STATISTICAL APPENDIX

Table A-1. Reduced Forms for S/M_1, S/M_2 and S/M_3, Latin America, 1965–70–75

	Constant	RP	AGIN	RG	PIBED	TR	ESPR1	ESPR2	D_1	D_2
$S_1/M1$	.9634	2.7917	1.6513	0.4286	−1.8679	0.7785	—	—	—	—
	(4.4399)	(2.1538)	(1.2961)	(0.8945)	(−1.8669)	(0.6033)	—	—	—	—
$S_2/M2$	−3.7084	0.9582	—	0.2253	1.2931	1.1584	0.2821	—	—	—
	(0.9775)	(1.2060)	—	(0.8120)	(2.39[illegible]0)	(1.53)	(3.4873)	—	—	—
$S_3/M3$	3.6640	—	—	0.5749	—	2.0357	—	0.1544	−3.7007	−1.9183
	(2.1058)	—	—	(2.9091)	—	(3.8161)	—	(1.7944)	(3.4804)	(2.3312)

Notes: The values in brackets are for the value of the t-statistic.

The value of the Durbin-Watson coefficient is not presented since it has no statistical value when the lagged value of the endogenous variables is on the right-hand side of the equals sign; this is the present case.

Nor are the coefficients of determination R^2 presented since they have nothing to do with the levels of significance of the model. In addition, R^2 is a coefficient of linear association between variables; the model under consideration has several non-linear relations between variables.

Table A-2. Results of the Calculation of S_1/M_1 and Theoretical Hypotheses

Estimated parameters	Variable	Expected Sign	Remarks
26.9634	C	>0	Corresponds to A'07
2.7917	RP	>0	Corresponds to A'17
1.6513	AGIN	>0	Corresponds to A'27
0.4286	RG	>0	Corresponds to A'37
−1.8679	PIBED	<0	Corresponds to A'67. Note that the sign changes when the variable is in the structural form of the model.
0.7785	TRD	>0	Corresponds to A'67

C = Constant

Table A-3. Results of the Calculation of S_2/M_2 and Theoretical Hypotheses

Estimated Parameters	Variable	Expected Sign	Remarks
−3.7084	C	<0	Corresponds to A'08
0.9582	RP	>0	Corresponds to A'38
0.2253	RG	>0	Corresponds to A'48
1.2931	PIBED	>0	Corresponds to A'28
1.1584	TRD	>0	Corresponds to A'58
0.2821	ESPR1	>0	Corresponds to A'18

Table A-4. Results of the calculation of S_3/M_3 and Theoretical Hypotheses

Estimated Parameters	Variable	Expected Sign	Remarks
3.6640	C	>0	Equivalent to A_{09}
0.5749	RG	>0	Equivalent to A_{39}
2.0357	TRD	>0	Equivalent to A_{29}
0.1544	ESPR2	>0	Equivalent to A_{19}
−3.7007	D1	<0	Equivalent to A_{59}
−1.9183	D2	<0	Equivalent to A_{69}

Table A-5. Minimum Rate of the Gross Product in Relation to Educational Outlays Required to Maintain the Levels of Schooling of 1975 in Primary Education in Latin America

Country	PIBED elasticity in relation to RP	Rate allocated in 1975	Minimum rate required (%)
Argentina	0.53	4.00	0.74
Bolivia	0.57	4.90	0.80
Brazil	1.46	2.90	4.09
Chile	0.65	3.80	1.07
Colombia	1.22	3.30	3.27
Costa Rica	0.87	5.70	2.87
Dominican Republic	1.89	2.60	6.20
Ecuador	1.38	3.20	4.04
El Salvador	1.59	3.60	6.06
Guatemala	2.61	1.70	7.73
Haiti	3.44	0.70	5.50
Honduras	1.62	3.30	5.80
Mexico	1.68	3.10	5.81
Nicaragua	1.95	2.30	5.81
Panama	1.00	5.90	3.96
Paraguay	3.64	1.40	12.38
Peru	1.05	4.20	3.10
Uruguay	0.32	3.60	0.24
Venezuela	0.87	5.30	2.70
Average		3.45	4.32
Median		3.30	3.96

Source: Solution of the equation S_1/M_1 for each country taking into account its levels of RG and AGIN.

Table A-6. Minimum PIBED Required for Maintaining 1975 Levels in Secondary Education
(Percentages)

Argentina	2.15
Bolivia	5.55
Brazil	1.52
Chile	2.78
Colombia	5.35
Costa Rica	8.05
Dominican Republic	2.60
Ecuador	1.74
El Salvador	1.54
Guatemala	1.49
Haiti	1.58
Honduras	1.56
Mexico	6.12
Nicaragua	1.67
Panama	13.22
Paraguay	6.84
Peru	1.50
Uruguay	4.60
Venezuela	4.09

Table A-7. Difference between ESPR3 Observed and ESPR3 Expected for Maintaining the Status Quo Ante in 1975

	Difference*
Argentina	2.08
Bolivia	−2.52
Brazil	−0.32
Chile	−1.07
Colombia	−6.30
Costa Rica	0.53
Dominican Republic	3.75
Ecuador	4.43
El Salvador	1.66
Guatemala	1.57
Haiti	−2.46
Honduras	0.61
Mexico	−0.97
Nicaragua	−2.23
Panama	6.88
Paraguay	−4.43
Peru	1.80
Uruguay	1.66
Venezuela	−[illegible]35

*If the difference is negative, this means under-utilization of facilities at the higher level.

Table A-8. Growth Rate of the Real Product Required to Maintain Higher Education at the Same Relative Levels of 1975

	Growth rate required	Growth rate obtained
Argentina	0.33	1.1
Bolivia	−5.9	5.7
Brazil	1.91	11.2
Chile	2.3	5.9
Colombia	−11.5	5.2
Costa Rica	0.4	6.2
Dominican Republic	8.7	8.7
Ecuador	7.1	7.3
El Salvador	1.0	4.4
Guatemala	2.8	6.5
Haiti	−4.9	5.4
Honduras	1.4	6.0
Mexico	−3.1	2.6
Nicaragua	−2.4	5.3
Panama	11.1	4.2
Paraguay	−9.6	6.5
Peru	2.4	4.3
Uruguay	0	1.3
Venezuela	−2.1	5.6

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